NATIONAL CAR BUILDER

VOLUME XIV.
NUMBER 1.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

$1.00 PER ANNUM
SINGLE NUMBERS, TEN CENTS.

NEW YORK
Morse Building, 140 Nassau St.

JANUARY, 1883.

ENTERED AT THE POST OFFICE AT NEW YORK N. Y., AS MAIL MATTER OF THE SECOND CLASS.

CHICAGO:
144 N. Clark Street.

Boston. STANDARD CAR VARNISHES. Boston.
BURBANK, RYDER & DAMON.
Boston. Boston.

SELECT FURNITURE, Antique Designs, SPANISH AND VENETIAN LEATHERS.
Charles R. Yandell & Co.
INTERIOR DECORATIONS, Choice Curtain Materials.
No. 6 East 18th Street, New York.

VOSE
Graduated Springs
FOR
CITY, FREIGHT & PASSENGER CARS.
RICHARD VOSE,
13 Barclay St., NEW YORK.

J. BERNARD.
MANUFACTURER OF
Marqueterie of every description; dealer in French Walnuts, Colored and any other Veneers, especially adapted for Car-Work.
161 Greene Street, N. Y.

GEO. WESTINGHOUSE, Jr., President. T. W. WELSH, Superintendent. JOHN CALDWELL, Treasurer. W. W. CARD, Secretary. H. H. WESTINGHOUSE, General Agent.
THE WESTINGHOUSE AIR-BRAKE COMPANY,
Pittsburgh, Pa., U. S. A.,
MANUFACTURERS OF THE
WESTINGHOUSE AUTOMATIC BRAKE,
WESTINGHOUSE LOCOMOTIVE DRIVER BRAKE,
VACUUM BRAKES (Westinghouse & Smith Patents),
WESTINGHOUSE FREIGHT BRAKE.
The Automatic Freight Brake is essential y the same apparatus as the Automatic Brake for passenger cars, except that the various parts are one piece of mechanism, and is sold at a very low price. The saving in accidents, flat wheels, brakemen's wages and the increased speed possible with perfect safety, will repay the cost of its application within a very short time.
The "AUTOMATIC" has proved itself to be the most efficient train and safety brake known. Its application is instantaneous; it can be operated from any car in the train, if desired, and should the train separate, or a hose or pipe fail, it applies automatically. A GUARANTEE is given customers against loss from PATENT SUITS on the apparatus sold them.
FULL INFORMATION FURNISHED ON APPLICATION.

GEORGE WESTINGHOUSE, Jr., President. C. H. JACKSON, Vice-President and General Manager. HENRY SNYDER, General Agent. ROBERT PITCAIRN, Treasurer. ASAPH T. ROWAND, Secretary.
THE UNION SWITCH AND SIGNAL CO.,
A CONSOLIDATION OF
The Union Electric Signal Co., of Boston, Mass., and of the Interlocking Switch & Signal Co., of Harrisburg, Pa.
Sole Owners and Manufacturers of the only Practically Successful System of
OPERATING RAILROAD SIGNALS AUTOMATICALLY,
Also of Apparatus for Operating and Interlocking Switches, Signals and Gates by Levers, Hydraulics, Pneumatics or Electricity. Also Manufacturers of FROGS, CROSSINGS, SWITCHES AND SWITCH STANDS. Plans, estimates and detailed descriptions, together with references to apparatus in practical operation, will be furnished upon application.
Office and Works, cor. Fayette St., Garrison Alley and Duquesne Way,
PITTSBURGH, PA.

GEORGE WESTINGHOUSE, JR., President. RALPH BAGALEY, Secretary and Treasurer. H. H. WESTINGHOUSE, Superintendent
THE WESTINGHOUSE MACHINE COMPANY.
General Sales Offices: 92 and 94 Liberty St., New York.
Works: 24th and 25th St. and Liberty Ave., Pittsburgh, Pa.
Manufacturers of THE WESTINGHOUSE STEAM ENGINE, THE ALDEN CRUSHER AND PULVERIZER, DAMASCUS BRONZE. See illustrated advertisement on page v.

ACKNOWLEDGED TO BE THE BEST AND CHEAPEST.
STEWART'S
BRUSHES.
STEWART BROS' CO., PITTSBURGH, PA.

Warranted Superior to any Steel in the Market, either English or American, for every purpose. Send for Circular and Price List.
CHROME CAST STEEL.
CHROME STEEL WORKS,
Kent Av. & Keap St., Brooklyn, E.D., N.Y.

ANDREW KLOMAN, A. C. KLOMAN, C. H. KLOMAN, TESTAMENTARY TRUSTEES, Pittsburgh, Pa.,
CAR TRUCK CHANNELS
For all patterns of Iron Car Trucks
CORRESPONDENCE SOLICITED.

EMPIRE CAR ROOFING CO
GALVANIZED CORRUGATED IRON,
Flexible Joint, Sectional Car Roofing.
30,000 ROOFS IN USE.
SATISFACTION GUARANTEED.
R. B. CROUCH,
Sec'y, Treas. and Gen. Manager.
264 S. WATER STREET, CHICAGO.

CLIFF & RIGHTER CO.
(Limited),
MANUFACTURERS OF
SPRINGS,
OSWEGO, N. Y.

W. V. CASE LUMBER CO., Limited,
407 Walnut St., Philadelphia, Pa.
CAR LUMBER
DELAWARE WHITE OAK AND FLORIDA YELLOW PINE.

ESTABLISHED 1850.
TROY MALLEABLE IRON CO.,
MANUFACTURERS OF
REFINED AIR FURNACE MALLEABLE IRON.
Castings for General Railroad Work a Specialty.
TROY, N. Y.

AMERICAN WIRE NAIL CO.
FOR ROOFING AND SIDING
USE THE
BARBED WIRE NAIL.
Ask for Sample.
AMERICAN WIRE NAIL CO.,
COVINGTON, - - - - - KENTUCKY

CAR GLASS
A SPECIALTY.
Plate Glass 1-8, 3-16, 1-4 thick.
Crystal Plate 1-8 thick,
Double Thick French.
Crystal Sheet Glass,
26 oz. English Glass
Double Thick American.
All kinds of ORNAMENTAL GLASS for Drawing-room Cars, Sleepers, etc., etc. Ordinary Window, Rough and Ribbed Glass, for Depots, Shops, etc., etc. Colored Glass for Signals, etc.
Quotations, Samples and Designs sent on application.
HOLBROOK BROTHERS, 87 and 89 BEEKMAN STREET, NEW YORK.

PALMER, PARKER & CO.,
MAHOGANY AND VENEERS,
AND ALL FOREIGN AND DOMESTIC CABINET WOODS.
MILL AND WAREROOMS:
PORTLAND, Cor. TRAVERS ST., BOSTON, MASS.
Send for Price List.

BOUND VOLUMES OF THE NATIONAL CAR-BUILDER
For 1880, 1881 and 1882.
Price, - - - - - $3.00 each.

IRON CLAD PAINT.

Trade-Mark Patented.

This Paint is used by nearly all the Railroads in the Country.

Used by L. S. & M. S., Wabash R'y, C., C., C. & I. R'y, C. & P. R'y, C., H. & D. R. R., Cincinnati Southern R'y, N. Y., L. E. & W. R'y, (Erie), Southern Central R. R., Canada Southern, Mobile & Ohio, N. O. & Mobile, Macon & Brunswick, Penn. R. R., C., M. & St. P. R'y, A. & N. R'y, R. & D. R'y, Carolina Central, P., C. & St. L. R'y, P. & E. R. R., M., L., S. & W. R'y, K. & D. M. R'y, W. C. & A. R. R., M., L. & N. R'y, N. C. & St. L., N. I. & E. R. R., I. & G. N. R. R., etc., etc.

IRON CLAD PAINT CO., Cleveland, Ohio.

Established 1858.

THE
Prince Manufacturing
COMPANY,
SOLE MANUFACTURERS OF

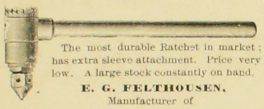
Prince's Metallic Paint.

The best Paint in the World for Iron, Tin and Wood.

Send for a Circular to

71 Maiden Lane, N. Y.

Patent Combination Ratchet Drill.



The most durable Ratchet in market; has extra sleeve attachment. Price very low. A large stock constantly on hand.

E. G. FELTHOUSEN,
Manufacturer of

HAND & AUTOMATIC CYLINDER OIL PUMPS,
Ball and Wheel Gauge Cocks, Flue Cleaners, etc.
Salesrooms, 59 and 61 Main Street;
Factory, 72-80 Washington Street,
BUFFALO, N. Y.

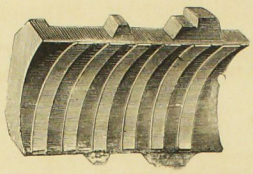
The prices of Worthington Steam Pumps and Boilers combined, for Railway Tank service, have been reduced. The combination embodies some improvements that have been made subject of letters patent, and the above reduction is made in order to insure its speedy adoption. The pumps are used on nearly all of the principal Railroads in this country and Canada. Send for Circular and reduced Price-list.

HENRY R. WORTHINGTON.

NEW YORK, 239 Broadway. BOSTON, 70 Kilby St. ST. LOUIS, 707 Market St.

The Leroy Journal Bearing Co.,

145 BROADWAY, NEW YORK CITY.



Has the **SOLE RIGHT** to manufacture and sell **JOURNAL BEARING BRASSES** under Letters Patent issued to T. V. Leroy, Nov. 18, 1879, and reissued Feb. 17, 1880, Aug. 16, 1881. Testimonials, which may be seen at the office of the Company, show our brasses to be the Best and Most Economical in use. We claim that their use saves one-third in oil, and two sets will outwear three of any other brasses. Those interested in Railroads will do well to examine. Address

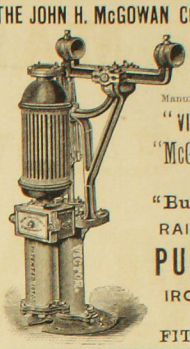
GEO. W. McLEAN,
President.

ANNUAL SALES 3,000,000 BOTTLES!

CARTER'S INKS

CARTER, DINSMORE & CO. BOSTON AND NEW YORK.

THE JOHN H. McGOWAN COMPANY,



Cincinnati, OHIO,

Manufacturers of

"VICTOR,"
"McGOWAN"
AND
"Buckeye"
RAILROAD
PUMPS,
IRON PIPE
AND
FITTINGS.

RIVAL STEAM PUMPS.

And BOILER FEEDERS.
John H. McGowan & Co., Cin'ti, O.

The best material in use for covering Roofs and sides of Railroad Buildings, Car Shops, etc.

GENERAL AGENTS FOR IRON ORE PAINTS.
Office and Works,
28 TO 32 RIVER STREET,
CLEVELAND, O.

Send for circulars and price list, naming the CAR-BUILDER.

FRENCH SPIRAL SPRING CO. LIMITED,

MANUFACTURERS OF

SPIRAL RAILWAY CAR SPRINGS,

Street Car, Buffer,

Freight Bolster,

Journal and Equalizing Bar Springs.

Pennsylvania Railway Co.'s Standard 20-ton Bolster Spring.

BRAKE RELEASE, SWITCH, VALVE AND MACHINERY SPRINGS FROM BEST CRUCIBLE STEEL.

AARON FRENCH, Chairman. GEO. W. MORRIS, Sec'y. CALVIN WELLS, Directing Manager. FRANK S. LAYNG, Treas. WALTER P. HANSELL, Sup't.

Corner of Twenty-Sixth and Liberty Streets, - - - - - PITTSBURGH, PA.

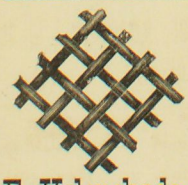
NEW YORK: 115 Broadway, Room 88; H. A. LITTLE, Agt. BOSTON: 52 Mason Bl'g; JOHN KENT, Agt. CHICAGO: 246 Clark Street; GEO. W. MORRIS. ST. LOUIS: 209 N. Third Street; M. M. BUCK & CO., Agts.

WM. SELLERS & CO., PHILADELPHIA,
MANUFACTURERS
MACHINE TOOLS AND TWEDDLE'S HYDRAULIC RIVETER.

THE 1876 INJECTOR BOILER-FEEDER

SIMPLE, RELIABLE AND EFFECTIVE.
Started, Regulated and Stopped by one Motion of a Lever.
Branch Office, 79 Liberty Street, NEW YORK.

CORRESPONDENCE SOLICITED
FOR



CAR DUSTER AND LOCOMOTIVE SPARK WIRE CLOTHS.

SPECIALTIES.

E. Holenshade, 136 Lake St., Chicago, Ill.

PORTABLE Machines for Use by Bridge, Engine and Boiler Makers.
PORTABLE Drilling, Tapping, Boring, and Reaming Machines
PORTABLE Machines for Wood Boring, Polishing, and Emery Wheel Grinding.

STOW FLEXIBLE SHAFT Co., Limited,
1505-1509 PENNSYLVANIA AVENUE,
PHILADELPHIA, - - PA.

STEEL CASTINGS

FROM 1-4 To 10,000 lbs. WEIGHT.

True to pattern, sound and solid, of unequaled strength, toughness and durability. An invaluable substitute for forgings or cast-iron requiring three-fold strength. Gearing of all kinds, Shoes, Dies, Hammer Heads, Cross-Heads for locomotives, etc. 15,000 Crank Shafts and 10,000 Gear Wheels of this steel now running prove its superiority over other steel castings. CRANK SHAFTS, CROSS-HEADS and GEARING specialties. Circulars and Price Lists free.

CHESTER STEEL CASTINGS CO.,
Works: CHESTER, Pa. 407 Library St., PHILADELPHIA.
C. HUBBARD, Agent, 46 Cliff Street, New York.

To MASTER CAR-BUILDERS.

YOUR ATTENTION IS INVITED TO OUR LARGE AND VARIED STOCK OF

HARDWOOD LUMBER and VENEERS,

OUR OWN MANUFACTURE, EMBRACING CHOICE SHADED AND FIGURED

MAHOGANY

IN VENEERS, PANEL THICKNESSES, ETC.

Stock for Head Linings, etc., and all other desirable woods for CAR BUILDING purposes. Reasonable prices. Sample order solicited.

GEO. W. READ & CO.,

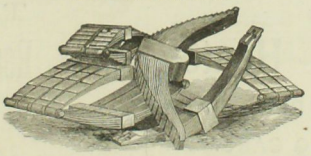
186 to 200 Lewis Street, Fifth to Sixth Streets, E. R., New York.

CALVIN WELLS. PITTSBURGH AARON FRENCH

CAST-STEEL SPRING WORKS

A. FRENCH & CO.,

MANUFACTURERS OF

EXTRA TEMPERED,  LIGHT ELLIPTIC

CRUCIBLE CAST-STEEL SPRINGS,

WITH PATENT HOT COMPRESSED BANDS FOR RAILROAD CARS AND LOCOMOTIVES.

UNITED STATES CENTENNIAL COMMISSION, OFFICIAL REPORT.—Diploma and Medal awarded for Good Design, Excellence of Workmanship and Material, Uniformity of Action and Durability.

OFFICE AND WORKS: Corner of Liberty and Twenty-first Streets, PITTSBURGH, PA.

H. A. LITTLE, Room 88, Boreel Building, New York; JOHN KENT, 52 Mason Building, Boston;
GEORGE W. MORRIS, 246 Clark Street, Chicago; M. M. BUCK & CO., 209 North Third Street, St. Louis, Mo., Agents.

CALVIN WELLS, President and Treasurer. JAS. K. VERNER, Secretary.

PITTSBURGH FORGE AND IRON COMPANY,

Office: TENTH ST., near PENN AVE.,

PITTSBURGH, PA.,

MANUFACTURERS OF HAMMERED

We make a Specialty of our well-known brand of Railway Axles marked "Special" from new iron, guaranteed to be purely fibrous, and to stand the regulation drop test of the Penna. R. R. Company.

ALSO,

BAR IRON & BOLTS,

Channel and Angle Iron, Bridge Bolts, plain and upset ends, all sizes, Track Bolts, Square and Hexagon Head Bolts, Rivets, Washers, Fish Plates, Etc.

J. HALL DOW, Prest. L. I. TODD, V. P. WM. DOW, Secy. C. A. HITCHCOCK, Supt.

UNION BRASS MANUFACTURING CO.,

CHICAGO, ILL.,

MANUFACTURERS OF

CAR HARDWARE.

Special Designs Furnished for the Interior Decorations of Day, Night and Parlor Coaches.

TRIMMINGS OF EVERY DESCRIPTION.

SOLE MAKERS OF

Niles' Patent Car Door Locks, **Morgan's Deck Sash Ratchet.**

MANSFIELD'S DECK SASH OPENER, TODD'S FREIGHT CAR LOCKS,
CAR SEATS OF EVERY DESCRIPTION, WOOD HEAD LININGS (in Oak, Bird's-Eye Maple and Birch),
ORME PATENT SAFETY VALVE, COTTIER STREET CAR CONC.

BRASS JOURNAL BEARINGS A SPECIALTY.

DOOR HINGES AND LOCKS, WINDOW AND BLIND FIXTURES.

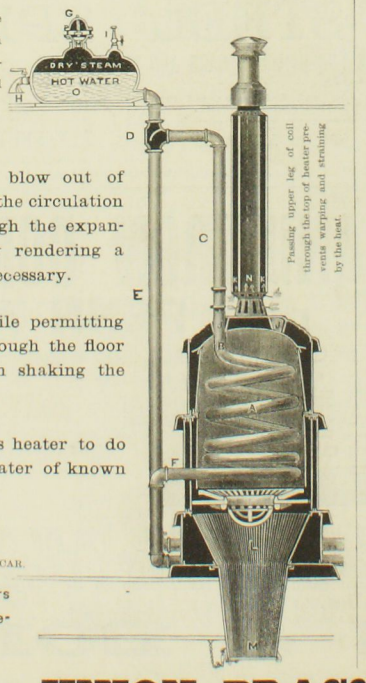
Basket Racks, Hoppers, Urinals, Engraved Glass, Saloon Fixtures, Switch and Freight Car Locks, Ventilators and Registers, Sleeping Car Trimmings and Fixtures, Mail and Baggage Car Trimmings, Street Car and Omnibus Trimmings.

THE CELEBRATED

Searle Hot Water Heater,

FOR HEATING PASSENGER, PARLOR, DRAWING ROOM AND SLEEPING CARS.

When the fire is low the pipes may be refilled through the funnel cock, without requiring the pipes to be cooled off.



Salt Brine cannot blow out of this heater, because the circulation does not pass through the expansion drum, thereby rendering a pressure gauge unnecessary.

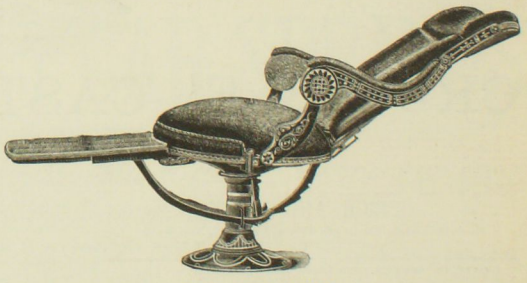
No dust arises while permitting the ashes to pass through the floor of the car, or when shaking the grate.

We guarantee this heater to do all that any car-heater of known repute will do.

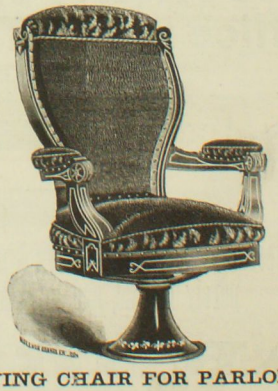
For Full Particulars Please Send For Descriptive Circular.

THE POPULAR

Hartley Reclining and Revolving Chair.



HEAD REST DOWN.



REVOLVING CHAIR FOR PARLOR CARS.

ADDRESS **UNION BRASS MFG. CO.,** 103 Ohio St., Chicago.

L. FRANKLIN F. GENET. JOHN S. SILVER.

GENET & SILVER,

MANUFACTURERS AND DEALERS IN

MAHOGANY,

GEORGIA PINE LUMBER AND TIMBER,

WALNUT, OAK, ASH, POPLAR,

And Other Woods for Manufacturers, Railroads and Car-Builders.

Office, 117 Temple Court, - - - NEW YORK CITY.

NATIONAL EXPOSITION OF RAILWAY APPLIANCES,

TO BE HELD IN

CHICAGO, from THURSDAY, the 24th day of May, to SATURDAY, the 23d day of June, 1883, in the INTER-STATE EXPOSITION BUILDINGS, the largest and best adapted for the purpose in the United States.

GOLD, SILVER AND BRONZE MEDALS

FOR SUPERIOR MERIT.

An abundance of STEAM POWER for running Machinery, and tracks for Locomotives and Cars.

Scientific and Practical Tests by the ablest Scientists and carefully selected Committees.

The Financial Stability of the Exposition assured by a GUARANTEE FUND of

FIFTY THOUSAND DOLLARS.

The proceeds, after payment of Expenses, to be devoted to BENEVOLENT PURPOSES connected with the RAILWAY SERVICE.

All material and articles properly coming under the head of RAILWAY APPLIANCES or SUPPLIES, admitted.

FOR FULL INFORMATION address the SECRETARY, care GRAND PACIFIC HOTEL, CHICAGO.

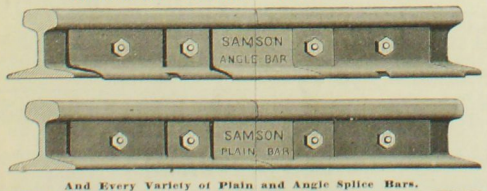
E. H. TALBOTT, *Secretary.* LUCIUS FAIRCHILD, *President.*

COMMISSIONERS.

Hon. LUCIUS FAIRCHILD, Ex-Governor of Wisconsin and late Minister at Madrid, Spain.
GEO. M. PULLMAN, President Pullman Palace Car Co., Chicago.
AARON FRENCH, Pittsburgh Car Spring Co., Pittsburgh.
J. MCGREGOR ADAMS, Adams & Westlake Mfg. Co., etc., Chicago.
E. V. CHERRY, Vice-President Post & Co., Railway Supplies, Cincinnati.
A. G. DARWIN, President Allen Paper Car Wheel Co., New York.
O. W. POTTER, President North Chicago Rolling Mill Co., Chicago.
H. E. SARGENT, late General Manager Northern Pacific R. R., Chicago.
JAMES MCMILLAN, President Michigan Car Co., etc., Detroit.
GEORGE WESTINGHOUSE, Jr., President Westinghouse Air Brake Co., etc., Pittsburgh.
J. H. BASS, Proprietor Bass' Car Wheel Works, Fort Wayne.
E. H. WILLIAMS, Baldwin Locomotive Works, Philadelphia.
WM. S. EATON, National Tube Works Co., etc., Boston.
WM. CHISHOLM, President Cleveland Rolling Mill Co., etc., Cleveland.
THOMAS M. CARNEGIE, President Edgar Thomson Steel Co., etc., Pittsburgh.
W. H. DOANE, President J. A. Fay & Co., Wood Working Machinery, Cincinnati.
M. M. BUCK, Railway Supply, St. Louis.
C. W. KOOKER, Vice-President Am. Live Stock and Meat Transportation Co., etc., New York.
JOHN E. GREEN, Vice-President Louisville Railway Supply Co., Louisville.
H. CLAY EVANS, Vice-President and General Manager Roane Iron Co., Chattanooga.
C. D. PETERS, Railway Supplies, England.
E. H. TALBOTT, President and Manager *The Railway Age*, Chicago.

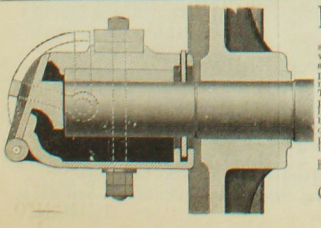
CHICAGO SPLICE BAR MILL.

MORRIS SELLERS & CO., Sole Proprietors and Manufacturers of the Celebrated "SAMSON" BAR



And Every Variety of Plain and Angle Splice Bars.

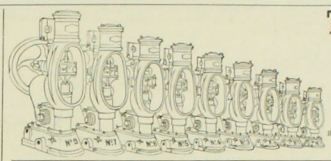
OFFICE, 6 ASHLAND BLOCK..... Mill, Chicago Ave. and the River..... CHICAGO.



RAOUL JOURNAL BOX.

This box is designed to provide an end stop for the axle, and thereby dispense with the shoulder and collar, and at the same time not obstruct the process of packing the box. The journal may be made any desired length and diameter. The life of the axle is doubled. The expense of brasses and lubricants enormously reduced; end wear of brasses and hot-boxes obviated. It is now in successful operation on trucks of engines, tenders, passenger and freight cars. For further information address

RAMAPO WHEEL & FOUNDRY COMPANY
Ramapo, N. Y.,
Columbus Iron Works Company
Columbus, Ga.



THE STEAM PUMPS

MADE BY

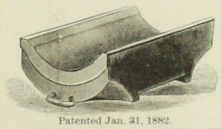
VALLEY MACHINE CO.,

Easthampton, Mass.,

are the Best in the World for Boiler Feeding and other purposes.

THE LEAD AND IRON BEARING.

CHEAP AND PRACTICAL



Patented Jan. 31, 1882.

NO CUT JOURNALS.

Better than Bronze or Brass of any kind.

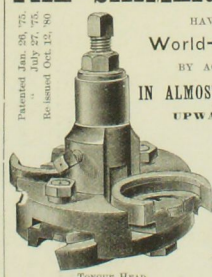
Strong, Durable, Tough and Pliable.

THEY FIT THE JOURNAL AND RUN COOL.

We guarantee our Bearings to give satisfaction in every particular. Send for descriptive circular.

G. J. SHIMER & CO., - - Freemansburg, Pa.

THE SHIMER MATCHING HEADS.



Patented Jan. 30, '75.
" July 27, '75.
Re-issued Oct. 12, '80.

TONGUE HEAD.

HAVE BEEN AWARDED A

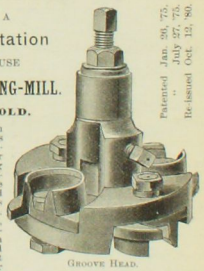
World-Wide Reputation

BY ACTUAL EVERY-DAY USE

IN ALMOST EVERY PLANING-MILL.

UPWARDS OF 9,000 SOLD.

The bits arranged in upper and lower series are secured to seats alternately inclined for the purpose of giving clearance to their cutting points—a feature peculiar to this head and the strong hold of its claim to public favor. Positively the lightest, strongest and most durable matching head in the world. Warranted to work the hardest cross-grained lumber with the greatest ease, and not chip up the edges. Send for descriptive circular.



Patented Jan. 30, '75.
" July 27, '75.
Re-issued Oct. 12, '80.

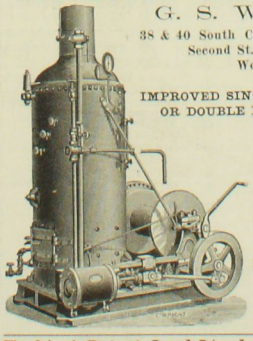
GROOVE HEAD.

SHIMER & CO., - - - - MILTON, PA.

ROCHESTER MACHINERY MF'G CO.

G. S. WORMER & SONS.,

38 & 40 South Canal St., Chicago, Ill. Branch 807 North Second St., St. Louis, Mo., and 55, 57 and 59 Woodbridge St., Detroit, Mich.



IMPROVED SINGLE OR DOUBLE CYLINDERS—SINGLE OR DOUBLE FRICTION DRUMS OR REVERSIBLE LINK MOTION

HOISTING ENGINES,

And specially adapted to Pile-Driving, Pumping, Hoisting Timber, Brick, Mortar, Stone, Coal, Slate, Ores, Iron, Cargo Ballast. Also for Steamers, Ships, Lighters, Barges, Docks, Warehouses, Stevedores, Contractors, Railroads, Mines, Quarries, Etc., Etc.

Send for special catalogues.

We make 180 different sizes and kinds.

IMPROVED PORTABLE AND STATIONARY ENGINES—PORTABLE, STATIONARY AND VERTICAL BOILERS, SAW MILLS AND MACHINERY.

On application will be pleased to send you catalogue of what you may want in the shape of machinery.

☞ Say where you saw this. ☜

Hopkins' Patent Lead-Lined, Self-Fitting Journal Bearings,

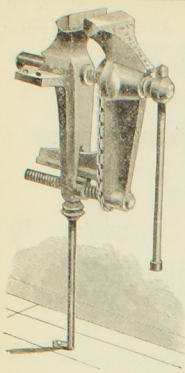
AND

Meneely's Patent Bell-Metal Ended Journal Bearings, for Reducing Lateral Wear.

MADE BY

CEO. R. MENEELY & CO., West Troy, N. Y.,

and Atlanta Brass Foundry (A. B. Bostick, Supt.), Atlanta, Ga.



Our NO. 6 VISE opens 10 inches, with 8-inch Jaws; has solid forged screws 1¾ inch diameter, with 20-inch lever. We make 5 smaller sizes of same pattern. Special discounts to R. R. Companies and Car Companies on application.

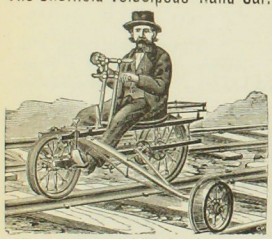
THE
FISHER DOUBLE-SCREW VISE.
FULLY WARRANTED.

Stronger than any other Leg Vise,
AND ALWAYS PARALLEL.
The Best Vise for R. R. Machine Shops and Car-Builders, and for all heavy work.
Accurate and Durable.
MADE ONLY BY
THE EAGLE ANVIL WORKS,
TRENTON, N. J.

Attention, Book Buyers! Big Pay to Agents!

ENGINEERS, FIREMEN, MACHINISTS, BOILER-makers, Car-builders, and Mechanics of every class, will find in MOORE'S UNIVERSAL ASSISTANT AND COMPLETE MECHANIC, a work containing 1016 pages, 500 Engravings, 461 Tables, and over 1,000 Industrial Facts, Calculations, Processes, Secrets, Rules, etc., of rare utility in 300 Trades, to any Mechanic or Business Man. AGENTS WANTED. Sure sale everywhere, for all time. For Ill. Contents Pamphlet, Terms, and 128 page Catalogue of 3000 Practical Books, address NATIONAL BOOK CO., 23 Beekman street, New York.

The Sheffield Velocipede Hand-Car.

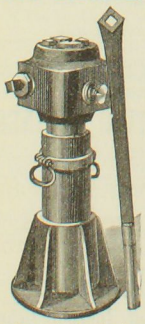


This Hand-Car is especially adapted to the use of **Road-Masters, Bridge Inspectors, Telegraph Line Repairers, Track Inspectors, Track Walkers, Wood and Tie Inspectors,** and for all work where one or two men wish to go over the line at will. Also, our Telegraph Cars, capable of carrying two men and material. Light. Easily Handled, and when ready for shipment occupy very little space in Baggage Car—a great advantage to railroad men. Run easily, being propelled by the **ROWING MOVEMENT.** Can be run short distances at the rate of **20 Miles an hour; and will not jump the track.**

HENRY W. PEABODY & CO.,
114 STATE STREET, BOSTON,
GENERAL PURCHASING AGENTS
For Foreign Railway and Tramway Companies

THE
"RELIANCE" HYDRAULIC JACK

SIMPLE IN CONSTRUCTION AND DURABLE.



Manufactured of Selected Material in the most thorough manner.

Lowering valve worked by thumb screw, giving operator perfect control in lowering. Pump plunger guided top and bottom, insuring perfect working.

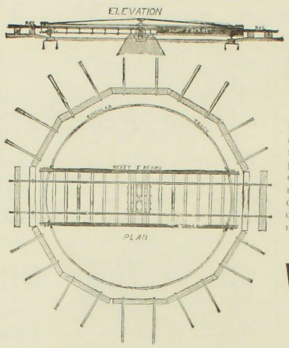
PHILIP S. JUSTICE,
14 N. 5th Street - - Philadelphia.

MORSE TWIST DRILL AND MACHINE COMPANY

MANUFACTURES
Patent Twist Drills, Machine Bits for Wood, Bit Stock Drills, Reamers, Standard Gauges, Milling Cutter and Special Tools, for use in Railroad, Car and Locomotive Shops. **NEW BEDFORD, Mass.**

R. D. THORNBURGH, Pres't. NORRIS B. GREGG, Sec'y.

MOUND CITY PAINT AND COLOR CO.,
ST. LOUIS, MO.,
MANUFACTURE
FINE RAILWAY AND COACH VARNISHES.
Colors, Dry, in Oil and Ground in Japan.
FREIGHT CAR AND BRIDGE PAINTS READY FOR USE

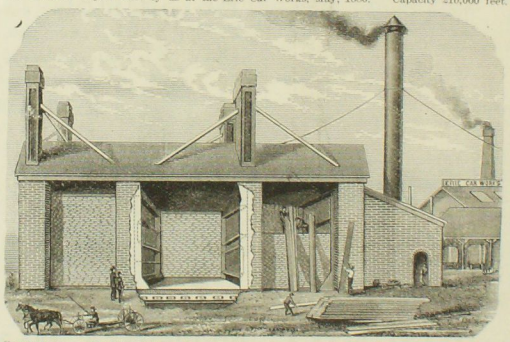


NEW
LOCOMOTIVE TURNTABLE.

This cut represents a recently patented wrought iron turntable of simple construction, and easily adjustable to height by a center pivot screw, and made with special reference to avoiding a deep pit, as in present turntables—thus saving the cost of circular retaining wall, consequent draining, and the filling up with snow and ice. The longitudinal trusses are made of I or other shaped beams of great strength, and can be operated by one man. Address:

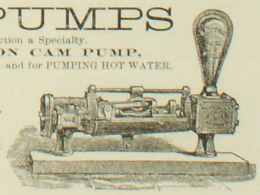
WILCOX & STOCK,
TOLEDO, O.

THE INVINCIBLE LUMBER DRYER.
PATENTED IN THE UNITED STATES AND CANADA.
Six Chamber Dryers built by us at the Erie Car Works, May, 1880. Capacity 210,000 feet.

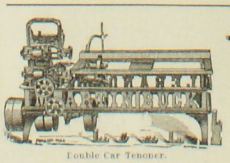


Constructed on new and scientific principles. The only perfect Lumber Dryer invented, and is the cheapest and best in the market. Adapted to any size from 10,000 feet capacity up. Send for illustrated Catalogue of all sizes. We secure all parties we build for against infringement. THE INVINCIBLE LUMBER DRYER CO., P. G. FINN, Manager, 20 N. Park Row, Erie Pa. BURDSALL & CRAWFORD, Agents, 11 State Street, Chicago, Ill.

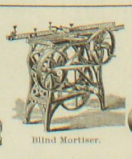
STEAM PUMPS
For Boiler Feeding and Fire Protection a Specialty.
THE IMPROVED DAYTON CAM PUMP,
Designed and built especially for BOILER FEEDING and for PUMPING HOT WATER.
Steam Pumps and Hydraulic Machinery
For Railroad Purposes.
The Combined Pump and Boiler, with Removable Water Cylinder.



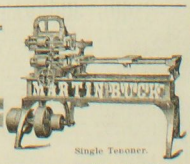
The MOST POWERFUL FIRE PUMPS ever made. Every machine warranted. Over **1,800** in use. Send for Descriptive Circulars.
SMITH, VAILE & CO., Dayton, O.
CHICAGO HOUSE, 24 WEST LAKE STREET.



Double Car Tenoner.



Blind Mortiser.



Single Tenoner.

Single, Double and Triple Tenons and Gaining done on the same machine; especially adapted to car work. Single Tenoners all Iron, with carriage mounted on trucks; Blind Mortiser and Borer combined for fixed and rolling slats; Adjustable Groover Heads, and a full line of Wood-working Machinery.
MARTIN HUCK, Lebanon, N. H.

CELEBRATED
WOOD WORKING MACHINERY
IRON TOOLS,
ENGINES & SUPPLIES.
H. B. SMITH MACHINE CO.
CORRESPOND WITH US 925 MARKET ST.
AVAIL YOURSELF OF OUR LARGE STOCK. PHILADELPHIA, PA. U.S.A.

ANNOUNCEMENT.

W. & J. SLOANE

Are now exhibiting a splendid collection of Axminster, Wilton and Brussels CARPETINGS, prepared expressly for Parlor and Sleeping Cars; also, OIL CLOTH, LINOLEUM, LIGNUM and CORTICINE-COCOA and ROPE MATS, MATTING and RUBBER MATS, at Lowest Wholesale Rates.

BROADWAY,
EIGHTEENTH & NINETEENTH STS.
NEW YORK.

STEEL CASTINGS.
RAIL-ROAD AND MACHINE CASTINGS
OF ALL KINDS FROM ¼ LB TO 10 TON.
LOCOMOTIVE CROSS HEADS
AND GEARING A SPECIALTY.
EUREKA CAST STEEL CO.
No. 307 WALNUT ST. PHILADA.
WESTERN OFFICE 45 LA SALLE ST. CHICAGO, ILL.

JOHN R. GRAHAM,
IMPORTER AND DEALER IN
ROSEWOOD & MAHOGANY,
AND ALL OTHER
FOREIGN AND DOMESTIC
CABINET WOODS,
SUITABLE FOR CAR WORK.
Cor. 11th Ave. and 30th St.
NEW YORK.

TAPS, DIES AND GAUGES,
U. S. OR SELLERS & WHITWORTH STANDARD.
THE PRATT & WHITNEY CO.
Hartford, Conn.
Illustrated Catalogues and Price Lists furnished on application.

RAILWAY MACHINERY AND SUPPLIES.
L. G. TILLOTSON & CO.,
MANUFACTURERS OF
Railway Car Findings.
PLUSH IMPORTERS.
RUBBER GOODS,
COTTON WASTE.
DEALERS IN
RAILWAY SUPPLIES
OF EVERY DESCRIPTION.
Nos. 5 and 7 Dey Street, New York.

JOHN T. LEWIS & BROS. WARRANTED PURE WHITE LEAD. PHILADA.

TRADE MARK.

Manufacturers of White Lead, Red Lead, Litharge, Orange Mineral, Linseed Oil and Painters' Colors.

No. 231 South Front Street.

Important to Railroad Managers and Master Mechanics.

SIBLEY'S PERFECTION VALVE OIL.

More perfect lubrication insured, and entire freedom guaranteed from corrosion of cylinders and destruction of steam joints by fatty acids.

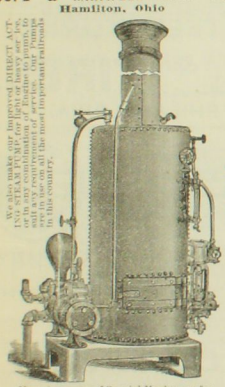
In exclusive use on 50 railroads.

References and prices furnished upon application.

☞ Make exclusive specialty of the Manufacture of Valve and Signal Oils for Railroad use.

SIGNAL OIL WORKS,
FRANKLIN, PA.
J. C. SIBLEY, President.

COPE & MAXWELL MFG. CO.,
Hamilton, Ohio



We also make our improved DIRECT ACTING STEAM PUMP for light or heavy service, or in any combination of Pumps to furnish to order, and guarantee it to be equal to any in use on all the most important railroads in the country.

Send for New Illustrated Catalogue and Price List.

Manufacturers of Special Machinery for

R. R. WATER-STATION PUMPING.

E. W. VANDERBILT. E. M. HOPKINS

VANDERBILT & HOPKINS,
RAILROAD TIES, CAR AND RAILROAD LUMBER
WHITE AND YELLOW PINE AND OAK.
No. 120 Liberty St., N. Y.
Also North Carolina Pine Boards. Plank and Dimension Lumber to Order.
GENERAL RAILROAD SUPPLIES.

Eclipse System of Water Supply for Railroads.

ECLIPSE SOLID WHEEL WIND MILLS.

Tested 14 years. Perfectly self-regulating. Conceded by the leading railway companies of this and other countries to be by far the strongest, safest and most powerful wind mill made.

Frost Proof Tanks
100 to 100,000
Gallons capacity, with all modern appliances.

Outlet Valves Spouts and Fixtures.

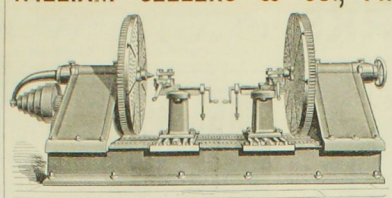
Improved Double-Acting Pumps.

SOLID WHEEL. No Loose Sections.

We have furnished over 500 wind mills and 250 complete water stations in 1881 to the leading railroads in the United States and Canadas. Two million feet of tank lumber constantly on hand. Our capacity is such that we can execute large orders promptly. Complete stations erected on trial when desired to test the correctness of our claims. Send catalogue and price-list.

ECLIPSE WIND ENGINE CO
W. H. WHEELER, Manager,
BELOIT WIS.

WILLIAM SELLERS & CO., PHILADELPHIA,



Iron and Steel Working Machine Tools, for Railways, Machine Shops, Rolling Mills, etc.

TURN-TABLES, PIVOT BRIDGES, SHAFTING.

BRANCH OFFICE, 79 LIBERTY STREET, NEW YORK.

228 Hudson Street, New York. THE 346 Euclid Avenue, Cleveland, O.

MICA MANUFACTURING CO.,

SOLE MAKERS OF THE FAVORITE

Improved Mica Car Grease

AND ALL GRADES OF CAR, AXLE AND ROLLING-MILL GREASES

☞ Correspondence invited and sample barrels cheerfully furnished for trial.

31 Michigan Avenue, Chicago, Ill. 508 Delaware Street, Kansas City, Mo.

Denison's Cooling Lubricating Compound,

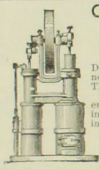
FOR COOLING AND LUBRICATING HOT JOURNALS.

DIRECTIONS.—For cars or engines, pack the box so that the Compound will come in contact with the bearing and journal, using waste saturated with oil; also moisten the Compound with oil. For shafting and places where waste can not be used, mix the Compound with oil, and apply to the bearing. If the bearing be very hot, the first application may run off, but two or three applications will cool it. When a journal is hot, don't cool it with water, but apply the Compound; **and no matter how hot it is, it will cool it while in motion.** When you apply new bearings, fill them with the Compound before putting them on the axle, and pack the sides of the box next to the bearing with the Compound, and your boxes will run cool. **For Sale by**

ALLEN MIDDLETON, 945 Ridge Ave. Phila. C. A. SMITH 113 Liberty St., N.Y.

Cheap Pumping for Railroad Water Stations.

RIDER (HOT AIR) PUMPING ENGINE



Does not require a special attendant; the station agent or any employé can run it (cannot explode); is extremely simple, and the pump is easier to repair THAN ANY IN THE WORLD.

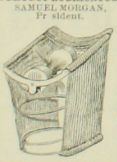
When vertical distance from water to top of tank does not exceed 40 feet the 6-inch engine will pump 1,200 gallons and the 10-inch engine 3,500 gallons per hour, consuming only five and ten pounds of coal respectively. THIS WE GUARANTEE. Used and indorsed by nearly 200 railroads. For particulars and illustrated catalogues apply to

CAMMEYER & SAYER,
93 Liberty St., New York, and 20 W. Lake St., Chicago, Ill.

PERFECT LUBRICATOR. NO HOT JOURNALS. OVER FIFTY PER CENT. SAVING

SAMUEL MORGAN, President. GEO. G. GORDON, Vice-President. C. C. DUNN, JR., Treasurer. GEO. C. MITCHELL, Secretary.

THE AMERICAN LUBRICATING CO.,



Manufacturers of CAR AXLE LUBRICATORS,

No. 407 NORTH THIRD STREET, PHILADELPHIA.

Spiral Spring four and a half inches high, four inches in diameter, fastened to a malleable iron top, containing a roller with bristles transversely inserted, the sides of the spring covered with felt and having one of the lips formed of the same material; when in position the outer edges of the concave roller are pressed against the surface of axles, the motion of which causes the roller and bristles to revolve and to distribute the oil in proportion to the velocity of the axles while the sides of felt saturated with oil act as "wipers" and lubricators; and the end lip performs similar duties, preventing waste of oil and the entrance of grit and dust.

J. E. SULLIVAN & CO.,

WHOLESALE DEALERS IN

RAILWAY SUPPLIES, PIG IRON, BLOOM AND ORE, OLD RAILS,

Car Wheel Axles, &c. Scrap Iron, Steel, Borings, Turnings,

Metals of all kinds.

693, 695, 697 LIBERTY STREET, PITTSBURGH, PA.

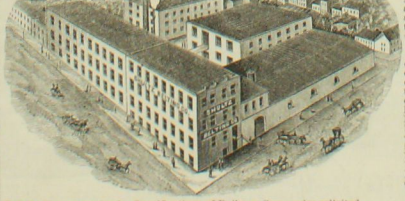
J. A. J. SHULTZ, President. B. C. ALVORD, Secretary.

SHULTZ BELTING CO.,

Cor. Easton and Barton Sts., St. Louis, Mo.

MANUFACTURERS OF

Shultz Patent Fulled Leather Belting, Lace and Picker Leather.



OUR Belting is made of Leather tanned on the surfaces only; the interior (which is the fibre and strength of the hide) is not tanned, but Rawhide fulled and softened by our patent process. Our Belting is more pliable, and hugs the pulley better and transmits more power than any other belt. It does not pull out at the lace holes or rivets. It stretches less than any other belt. It works equally well for the largest Driving Belts or for the fastest running machinery and smallest pulleys. Our LACE LEATHER is made of Rawhide, by our patent process, without any tanning, and is stronger, and will wear better than any other. We also make the best Picker Leather and Belt Grease in the country.

Satisfaction guaranteed. Specifications of Railway Companies solicited.

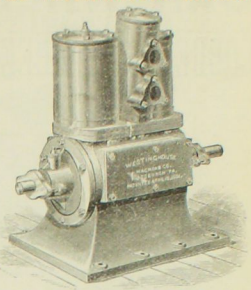
Boston House, 20 Milk St., FRANK PIERCE, Manager. Utilles Baird, 75 Water St., Pittsburgh, Pa.

Philadelphia House, 140 N. Third St., JAMES GARNETT, Manager. Curds & Co. Mfg. Co., 10 Franklin St., Chicago, Ill.

Agents in all Cities.

GEO. WESTINGHOUSE, JR., Pres.; RALPH BAGALEY, Sec. and Treas.; H. H. WESTINGHOUSE, Superintendent.

THE WESTINGHOUSE ENGINE



requires neither *Adjustment, Lining, Keying up, Packing, Oiling or Wiping*, and

Dispenses Entirely with Skilled Engineers.

2 to 150 Horse-Power.

Send for Illustrated Circular.

THE WESTINGHOUSE MACHINE CO.
92 AND 94 LIBERTY ST., NEW YORK.

STEEL CAR PUSHER

Made entirely of STEEL.

One Man

with it can easily move a loaded car. *Will not slip on ice or grease.* For sale by

E. P. DWIGHT
RAILROAD SUPPLIES,
407 Library St., PHILA.

CRANE BROS. MANUFACTURING CO.,
CHICAGO,
MANUFACTURERS OF

STANDARD WEIGHT { LAP-WELD } WROUGHT-IRON

PIPE,

Brass and Iron Goods

For Steam and Gas-Fitters and Engine Builders.

Cast Iron and Malleable Iron Fittings,

STEAM PUMPS,

Hollow Stay-Bolt Iron, Babbitt Metal, &c.

RAILWAY SUPPLIES.

H. L. LEACH,
NEW ENGLAND AGENT
FOR

Nathan & Dreyfus—Oilers and Lubricators and Freidmann's Injectors and Ejectors; C. W. Pickering & Co.—Locomotive and Car Springs.

Boiler Tubes, Plate Iron and Steel Boilers, Tanks, Machinists' Tools, Locomotive Frames, Crank-Pins, Axles, Head Lights, Steam Gauges, Car Wheels Etc., Etc.

77 WATER STREET, BOSTON, MASS

THE STANDARD LUBRICATING OIL OF AMERICA
FOR RAILROADS.
GALENA
ENGINE, COACH AND CAR OIL.

Gravity, 26°, 27°, 28°, 29°, Cold Test, 10° to 15° below zero.

No freezing in coldest weather, and entire freedom from hot journals at any time, as its exclusive use upon a majority of the leading railroads has demonstrated.

Showing Better Results than any Oil Extant.

REFERENCES FURNISHED ON APPLICATION.

GALENA OIL WORKS (Limited),
FRANKLIN, PA.

BRADLEY'S
Insulated Air Covering

(Made of Asbestos and Soft Feltings.)

For Boilers, Steam, Hot-Air, Gas and Water Pipes. To prevent the Condensation of Steam and the contents of Gas and Water Pipes from freezing.

THE BRADLEY MFG. CO.
Office, Room 1 Jones & Laughlin's Block.
Co Lake and Canal Sts. Chicago Ill.

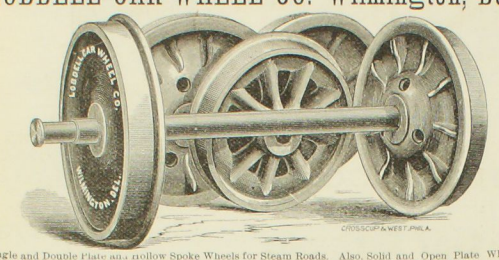
ESTABLISHED 1847.

A. WHITNEY & SONS'

CAR WHEEL WORKS,

PHILADELPHIA, PA.

LOBDELL CAR WHEEL CO. Wilmington, Del.

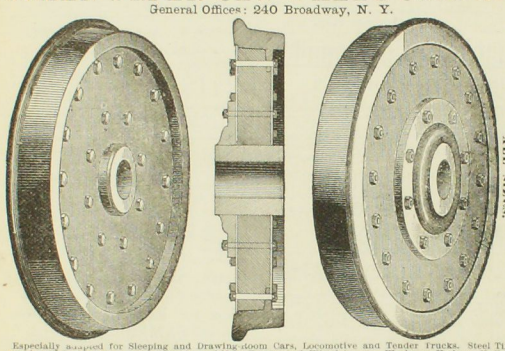


Single and Double Plate and Hollow Spoke Wheels for Steam Roads. Also, Solid and Open Plate Wheels for Street Roads. Wheels with Turned Threads, under the Patent of "W. W. Lobdell."

GEO. G. LOBDELL, President. W. W. LOBDELL, Secretary. P. N. BRENNAN, Treasurer.

ALLEN PAPER CAR WHEEL COMPANY,

General Offices: 240 Broadway, N. Y.



MANUFACTURERS OF ALLEN'S PATENT PAPER CAR WHEEL, ALL SIZES.

Especially adapted for Sleeping and Drawing-Room Cars, Locomotive and Tender Trucks. Steel Tire with Annular Web—Strongest, Most Durable, and Most Economical Wheel in use. Works at Hudson, N. Y.; and at Pullman (near Chicago), Ill.

A. G. DARWIN, President. J. C. BEACH, Treasurer C. H. ANTES, Secretary.

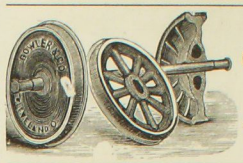
DAVENPORT, FAIRBAIRN & CO.,

ERIE, PA.

MANUFACTURERS OF

CAR WHEELS.

Capacity 350 Wheels per day. Wheels made by improved process. Far more durable than those made in the ordinary way.



CLEVELAND FOUNDRY.

Car Wheels of All Kinds and Sizes

WITH OR WITHOUT AXLES.

CHILLED-FACED RAILROAD FROGS

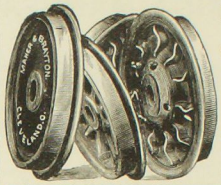
Street Railroad Turnouts.

ROLLING MILL AND MACHINERY CASTINGS

Nos. 9, 11 and 13 Winter St., Cleveland, O.

BOWLER & CO.

CLEVELAND WHEEL AND FOUNDRY WORKS,



MAHER & BRAYTON, Proprietors.

MANUFACTURERS OF

CAR, ENGINE, TRUCK AND TENDER WHEELS, RAILROAD, ROLLING-MILL AND MACHINERY CASTINGS, AND STREET RAILROAD WHEELS AND TURNOUTS.

ALSO,

CHILLED-FACED RAILROAD FROGS.

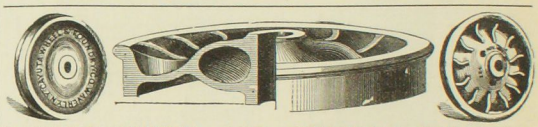
Office: 20 Carter Street.

Works: Cor. Carter and Collins Streets, Cleveland, O.

THE STANDARD STEEL WORKS.

LOCOMOTIVE & CAR WHEEL TIRES.

220 S. FOURTH ST., PHILADELPHIA.



RAMAPO WHEEL AND FOUNDRY COMPANY,

MANUFACTURERS OF

Chilled Wheels for Drawing-Room and Sleeping Coaches, Locomotives, Tenders, Passenger and Freight Cars.

GEO. CHURCH, President and Treasurer. W. W. SNOW, Superintendent and General Manager

RAMAPO, ROCKLAND COUNTY, N. Y.

CHILLED CAR WHEEL GRINDING COMPANY.

Patented in United States and Canada.

H. M. YERRINGTON, President. HARRY HUNTER, Vice-President. J. H. GOWEN, Superintendent. C. P. MASON, Secretary and Treasurer.

The GOWAN CHILLED CAR WHEEL GRINDING MACHINE, which we now introduce, is no hasty device. It is the result of four and one-half years' experience, and during that time has received a most thorough test, with satisfactory results.

Railroad officials, upon reflection, will admit it is more essential to have a machine to true up Chilled Car Wheels than a Tire Lathe for turning locomotive tires, for this reason: four or more driving wheel tires are required for one engine; a greater number of Car Wheels compose a train; hence the necessity of this invention.

The great hardness of the chilled tread has hitherto rendered the operation of turning them impracticable, owing to the great expense, which made it cheaper to frequently replace the worn wheels with new ones. To obviate these objections and reduce the cost of this process, we furnish a machine capable of making a perfect wheel at small expense.

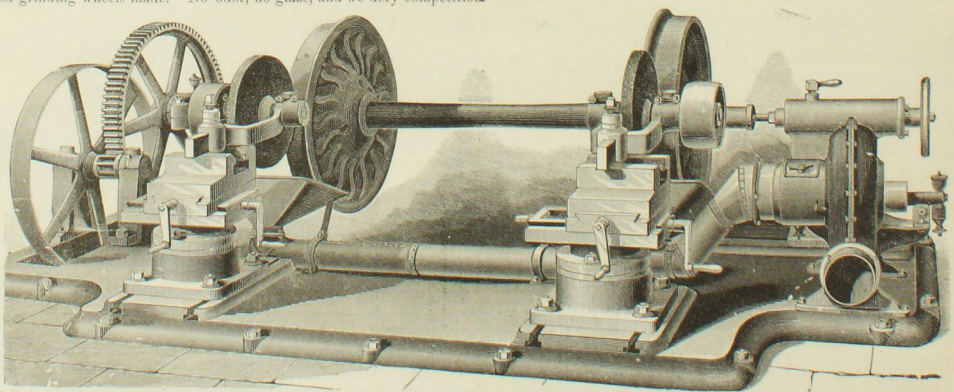
Wheels with flat places, and otherwise badly worn, that are ordinarily condemned and used for scrap iron, can be ground and fitted so as to double their original mileage. This alone makes our machine the greatest money saver ever introduced to railroads.

A sound Chilled Car Wheel trued by our method cannot be excelled by a paper or any other description of Car Wheel with steel tire.

Any person having a slight acquaintance with tools may, after five hours' instruction, become thoroughly competent to operate our machine.

Allowing all new wheels to be 3-32 inch oval, if properly fitted to axles, our machine *will* true up one pair an hour.

We manufacture expressly for use with our machine, Abrading Wheels, which, as the result of a series of experiments and long experience, we guarantee to be the best grinding wheels made. No odor, no glaze, and we defy competition.



CENTRAL PACIFIC RAILROAD,
CHICAGO & NORTHWESTERN RAILWAY,
CHICAGO, ROCK ISLAND & PACIFIC R'WAY,
VIRGINIA & TRUCKEE RAILROAD,
PENNSYLVANIA RAILROAD,
DENVER & RIO GRANDE RAILWAY,
CHICAGO, MILWAUKEE & ST. PAUL RAILROAD,
CANADIAN PACIFIC RAILROAD (VALE B. C.),

UNION PACIFIC RAILWAY (DENVER & SOUTH PARK DIVISION),
SOUTH PACIFIC COAST RAILROAD,
NEVADA COUNTY NARROW GAUGE RAILROAD,
CHICAGO CITY RAILWAY (SOUTH DIVISION),
NEW YORK, ONTARIO & WESTERN RY.,
LEHIGH VALLEY R. R.,
PULLMAN PALACE CAR CO.,

ALLEGHENY VALLEY RAILROAD,
CHICAGO CITY RAILWAY (WEST DIVISION),
CARSON & COLORADO RAILROAD,
LAKE TAHOE NARROW GAUGE RAILROAD
UNITED STATES R. STOCK CO.,
BALTIMORE & OHIO R. R.,
NEW YORK, LAKE ERIE & WESTERN.

We are prepared to sell machines outright, or to furnish them on royalty for each pair of wheels trued. Address

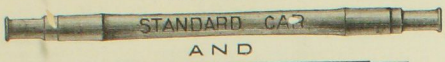
CHILLED CAR WHEEL GRINDING COMPANY, CARSON, NEVADA, OR 3 GRAND PACIFIC HOTEL, CHICAGO, ILL.

J. H. HAPGOOD, Sales Agent, 72 Astor House, New York.

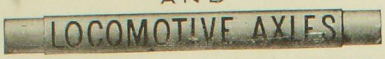
J. B. WINSTANDLEY, Pres. GEO. E. SACKETT, Sec. and Treas. J. T. WRIGHT, Supt.

NEW ALBANY STEAM FORGE,

MANUFACTURERS OF



AND

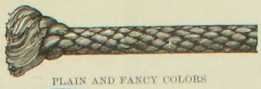


Crank Pins, Equalizers, Slide-Bars, Connecting, Parallel and Piston Rods. Heavy Forgings of all Kinds of Iron and Steel.

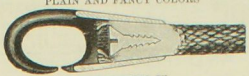
Office and Works, New Albany, Ind.

SOLID BRAIDED

BELL CORD & BELL-CORD COUPLINGS



PLAIN AND FANCY COLORS



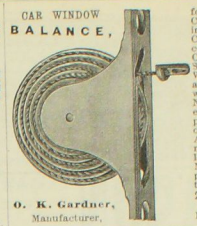
MANUFACTURED BY

SILVER LAKE CO.

WILLINGTON BROS. & CO., Agents, BOSTON.

CAR WINDOW

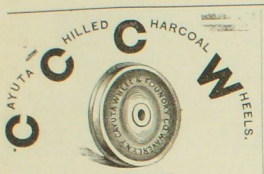
BALANCE,



for Passenger Coaches, Sleeping and Parlor Car Windows, consisting of Cone and Coil Spring with Wire Cord, balancing the weight of sash. Noiseless in operation, and placed entirely out of sight. Adopted by many of the leading roads. No car complete without them.

O. K. Gardner, Manufacturer, 28th and Railroad Sts., Pittsburgh, Pa.

CAYUTA CHILLED CHARCOAL WHEELS.



MANUFACTURED BY

CAYUTA WHEEL AND FOUNDRY CO.

WAVERLY, N. Y.

M. LYMAN, Jr., Superintendent and Treasurer

L. H. TAYLOR, Pres. S. P. RABER, Sup't.

J. H. WALKER, Sec. and Treas.

MOWRY CAR WHEEL WORKS,

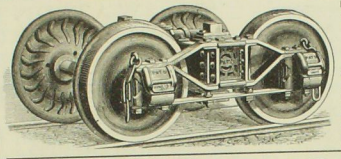
CINCINNATI, O.

Manufacturers of CAR WHEELS of all descriptions. Wheels and Axles, Chilled Tires; Engine, Car and Bridge Castings, of any pattern, furnished to order at short notice. Wheels of all sizes constantly on hand.

OFFICE: No. 274½ W. Third St., Cincinnati, O.

WORKS: Eastern Avenue and Lewis Street.

L. A. GREEN, Sup't, Cincinnati, O.

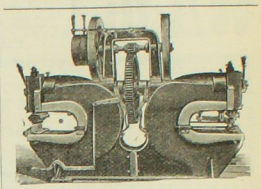


THE THIELSEN TRUCK CO.,

142 Dearborn St.,

CHICAGO, ILL.

We respectfully refer you to the following railroads using this Truck: R. & D.; K. C., St. J. & C. B.; M. R. F. S. & G.; C., B. & Q.; C., A. & St. L.; A., T. & S. F.; A. & N.; K. P.; F. & P. M.; M. C.; St. L., I. M. & S.; R. & M. R. (in Neb.); D. P.; L., L. & G.; C. V.; S. C.; Baldwin Locomotive Works.



Power Punches, Shears & Hammers.

We make over 100 sizes of Punches and Shears, Double and Single, varying from 500 to 90,000 pounds in weight, and adapted forevery variety of work. The Double machines are equal to two Single ones, as each side is worked independently. Also

ADJUSTABLE HELVE CUSHIONED HAMMERS

Of all sizes, Unequaled for Efficiency and Durability

THE LONG & ALLSTATTER CO.,

Hamilton, O.

TAYLOR IRON WORKS,

High Bridge, N. J.,

MANUFACTURERS OF

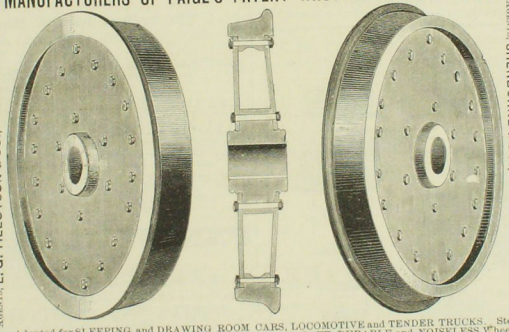
Chilled Iron Car-Wheels, Steel-Tired Wheels, Car and Locomotive Axles and Draw Hooks.

PAIGE'S WROUGHT METAL CAR WHEEL COMPANY.

Office, 18 and 20 Hampden St., Springfield, Mass.

MANUFACTURERS OF PAIGE'S PATENT WROUGHT METAL WHEELS.

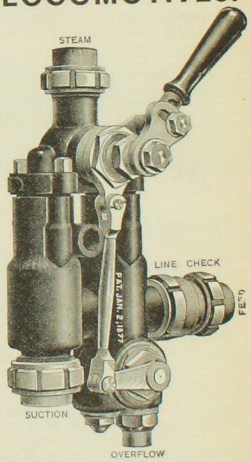
AGENTS, L. G. TILLOTSON & CO., 5 Dey Street, New York.



AGENTS, SHERBURNE & CO., 185 Water St., Boston, Mass.

Adapted for SLEEPING and DRAWING ROOM CARS, LOCOMOTIVE and TENDER TRUCKS. Steel Tires, with 1¼-in. Plates, securely bolted, making it a perfectly SAFE, DURABLE and NOISELESS Wheel.

THE IMPROVED HANCOCK INSPIRATOR FOR LOCOMOTIVES.



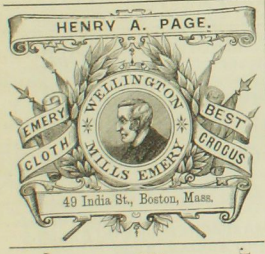
Send for Circulars and Full Particulars to

THE HANCOCK INSPIRATOR CO.

34 BEACH STREET,

Boston, Mass.

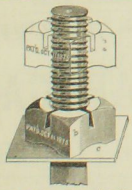
HENRY A. PAGE.



49 India St., Boston, Mass.

Atwood Safety Nut Co.,

Springfield, Mass.



J. W. LARABEE, Treasurer.

a, ATWOOD NUT on bolt without bearing on base—slots open.

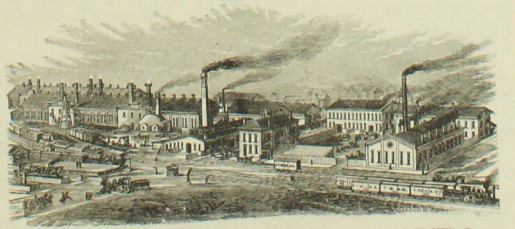
b, ATWOOD NUT turned to bearing *c*, partially closing the slots and grasping the bolt.

ESTABLISHED 1853. INCORPORATED 1873.

BASS FOUNDRY AND MACHINE WORKS.

MANUFACTURERS OF

Steam Engines, Boilers, Heavy Machinery, Car Wheels and Railroad Castings.



J. H. BASS, President. J. I. WHITE, Secretary. R. J. FISHER, Treasurer.

FORT WAYNE, IND.

ELBA IRON & BOLT CO.

(LIMITED),

MANUFACTURERS OF

Merchant Bar Iron,

SKELP IRON,

SPLICE BARS, RAILWAY TRACK BOLTS, CAR, BRIDGE AND MACHINERY BOLTS, NUTS, ETC.

WORKS:

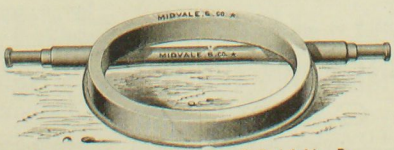
ELBA STATION, B. & O. R. R.,

TWENTY-THIRD WARD.

Office: Cor. SMITHFIELD & WATER STS.,

PITTSBURGH, PA.

THE MIDVALE STEEL CO



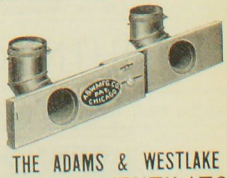
Works & Office: Nicetown, Philadelphia, Pa

TIRES AND AXLES OF EVERY DESCRIPTION.

HEAVY CASTINGS AND FORGINGS.

A. G. TOMPKINS & CO., Boston.
H. A. ROGERS, New York.
W. H. WALLACE & CO., New York.
WATSON, FLINT & CO., Philadelphia.
CREERAN, ADAMS & CO., Chicago.

FOSDICK & CO., Cincinnati.
W. & C. SEMPLE, Louisville.
E. H. LINLEY, St. Louis.
T. GUILFORD SMITH, Buffalo.



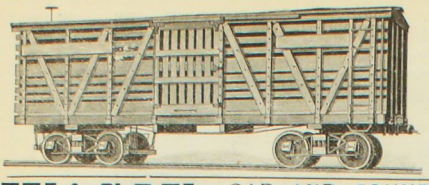
THE ADAMS & WESTLAKE WINDOW VENTILATOR

FOR RAILROAD OFFICES.

The only perfect device which will secure thorough ventilation. Adjustible to any size window. Each elbow contains a damper, so that the current of air can be easily regulated. In ordering, give width of the sash.

THE ADAMS & WESTLAKE MFG. CO.,

Cor. Franklin & Ontario Sts., Chicago;
45 Summer St., Boston;
7 East Fourteenth St., New York.



LA FAYETTE CAR WORKS,

LAFAYETTE, IND.

Freight and Caboose Cars of all kinds. Hand and Push Cars.

Warehouse Trucks and Baggage Barrows. Car Wheels and Castings.

B. F. MASTERS, Prest. C. E. GORE, Supt.

WASON

CAR AND FOUNDRY CO.,

CHATTANOOGA, TENN.,

MANUFACTURERS OF

FREIGHT CARS, CAR WHEELS AND CASTINGS OF ALL KINDS.

W. C. BELL J. M. BELL. S. J. BELL

CAN MAKE RAILROADS' ORDERS A SPECIALTY

Mills on Wolf River, at Memphis.

W. C. BELL & BROS.,

Memphis, Tennessee.

Orders solicited.

GUM LUMBER. WALNUT, ASH, POPPLAR, OAK, CHERRY.

Manufacturers of

Dealers in

BRADLEY CAR WORKS, WORCESTER, MASS.

ESTABLISHED 1833.

MANUFACTURERS OF EVERY DESCRIPTION OF

RAILWAY CARS.

OSGOOD BRADLEY, Proprietor.

MIDDLETOWN CAR WORKS.

MICHAEL SCHALL & ARTHUR KING, Proprietors,

MANUFACTURERS OF

RAILWAY AND MINE CARS.

SPECIAL ATTENTION GIVEN TO CAR REPAIRS.

MIDDLETOWN, PA.

HARRISBURG

CAR MANUFACTURING CO.

MANUFACTURE

PASSENGER, MAIL, BAGGAGE,

BOX, GONDOLA, COAL

AND ALL OTHER KINDS OF

RAILROAD CARS;

Railroad Car Wheels and Castings, Bridge and Rolling Mill Castings, Bridge Rods, Bolts and

RAILROAD FORGINGS.

GILL CAR M'F'G CO.,

Columbus, Ohio.

Make the best CARS and WHEELS.

JOHN STEPHENSON CO., Limited,

STREET CARS

And Omnibuses.

47 East Twenty-Seventh St., N. Y

CAR SEATS.

GEORGE BUNTIN & CO.,

SOLE MANUFACTURERS OF

Buntin's Patent Car Seats,

AND NICKEL PLATED ARM CAPS, IN USE ON RAILROADS GENERALLY.

NO. 1,042 Ridge Ave., PHILADELPHIA.

MICHAEL SCHALL. S. J. SHOOP.

DAUPHIN CAR WORKS,

DAUPHIN, PA.

Freight, Coal, Dump, and Mine Cars. Capacity six cars per day.

I. N. PENNOCK. W. PENNOCK.

PENNOCK BROS.,

MANUFACTURERS OF

RAILWAY CARS,

MINERVA, OHIO.

MANGANESE BRONZE AND BRASS CASTINGS,

FOR

Roll Neck, Car Journal and Machinery Bearings,

ALSO,

BABBITT'S ANTI-FRICTION METAL,

MANUFACTURED BY

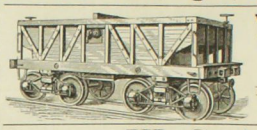
John Fitzsimmons, Brass Founder, 23 Carson St., Pittsburgh, Pa.

PARDEE CAR WORKS,

WATSONTOWN, PA.

PARDEE, SNYDER & CO. [Limited], Proprietors.

C. W. LEAVITT, Agent, 161 Broadway, Room 2, N. Y.



YOUNGSTOWN CAR WORKS

Railroad Freight Cars, Broad and Narrow-Gauge.

MILLIKEN, BOYD & CO.,

Youngstown, Ohio.

W. C. ALLISON,

Thirty-Second and Walnut Streets, Philadelphia,

Manufacture all kinds of Wrought and Cast Iron Work for Cars, Buildings and Bridges.

Every description of Railroad Cars, Bolts, Nuts and Washers. Also manufacture, from the best quality of iron, Gas, Steam and Water Pipe. Iron and Steel Lap-Welded Boiler Tubes.

LOCOMOTIVE BOILER TUBES A SPECIALTY.

LITCHFIELD CAR AND MACHINE COMPANY,

LITCHFIELD, ILLINOIS.

Manufacturers of all kinds of Passenger and Freight Equipment, both Wide and Narrow Gauge.

CAR WHEELS A SPECIALTY IN THE MACHINERY DEPARTMENT.

Especial attention is given to furnishing Hoisting Engines, Pit Cars, Dumps, etc., etc., for Coal Mines, as well as building Stationary Engines and Boilers, and General Brass and Sheet-Iron Work.

PENINSULAR CAR WORKS,

DETROIT, MICH.,

Operating Peninsular Car Works, Detroit Steam Forge and Adrian Car Works.

FREIGHT CARS OF EVERY DESCRIPTION.

WHEELS AND CASTINGS, HAMMERED IRON AXLES.

WORKS AT DETROIT AND ADRIAN, MICH.

CLARK & SMITH,

MANUFACTURERS OF

BAND SAWED MAHOGANY,

AND DEALERS IN

CABINET WOODS AND VENEERS

FOR CAR WORK.

Cor. Beverly and Travers Sts., - - BOSTON, MASS.

MAHOGANY

ESPECIALLY PREPARED FOR

CAR-BUILDERS,

IMPORTED AND MANUFACTURED BY

C. C. HOUGHTON & SONS,

No. 6 Howard Street, New York.

Yards Foot of Eighth Street, East Rive

THE CANTON CAR COMPANY,

MANUFACTURERS OF

ALL KINDS OF FREIGHT CARS,

CAR, BRIDGE AND RAILROAD CASTINGS,

Capacity, Ten Cars per Day CANTON, OHIO

Manufacturers of Cordrey's Patent Rotary Dumping Cars, Smith's Imperial Feed Mills, &c. Repairing of all kinds promptly done.

Car Wheels AND CASTINGS.

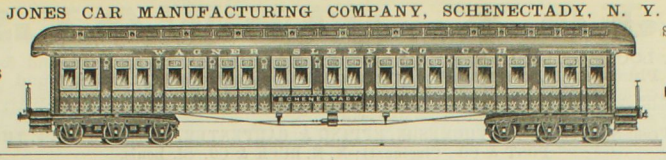
RUSSEL WHEEL & FOUNDRY CO.

DETROIT, MICH.

Logging Cars AND Car Trucks.

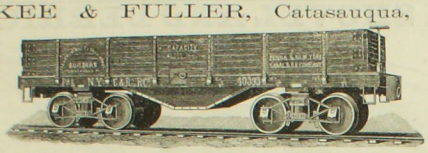
JONES CAR MANUFACTURING COMPANY, SCHENECTADY, N. Y.

BUILDERS OF SLEEPING AND DRAWING ROOM CARS AND PASSENGER COACHES.
WALTER A. JONES, Pres't and Treas.
BENJ. F. MANIER, Superintendent.



STREET RAILWAY CARS OF ALL VARIETIES, INCLUDING THE POPULAR EXCURSION OR SUMMER CAR
With all the late improvements.

LEHIGH CAR, WHEEL AND AXLE WORKS,
McKEE & FULLER, Catasauqua, Pa.,



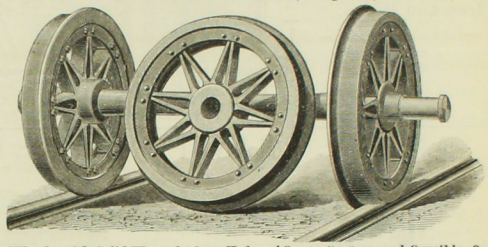
MANUFACTURERS OF
BROAD AND NARROW-GAUGE FREIGHT & COAL CARS
OF EVERY DESCRIPTION.
WHEELS For Freight, Locomotive, Truck, Tender, and Passenger Service, HAMMERED AXLES and other forgings.
Capacity: 16 BOX-CARS PER DAY, 300 WHEELS PER DAY.
Wheels Fitted to Axles, and Prices Furnished on Application.

THE HARLAN & HOLLINGSWORTH CO.,
CAR BUILDERS,
WILMINGTON, DEL.
Established in - - - - - - 1836.

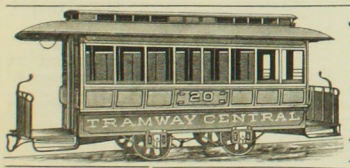
CORDESMAN & EGAN CO.,
MANUFACTURERS OF THE
Most Improved and Patented WOOD-WORKING MACHINERY,
Nos. 234 to 250 WEST FRONT STREET, CINCINNATI, O., U. S. A.

ERIE CAR WORKS (LIMITED),
ERIE, PA.
Capacity 16 Cars Per Day.
FREIGHT CARS OF BEST MATERIAL, AND CONSTRUCTION A SPECIALTY.

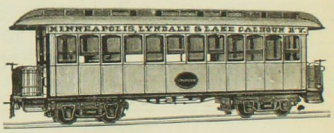
THE PATENT SHAFT AND AXLETREE CO. (Limited),
OF WEDNESBURY, ENGLAND,
MANUFACTURERS OF
Locomotive and Car Wheels, Tyres, Axles, Etc



Car-Wheels with Solid Wrought-iron Hub and Spoke Centres, and Crucible, Open-hearth and Bessemer Steel Tyres.
Secured by Mansell's patent fastening, or fastened without bolts under Stroudley's and various other patents.
S. WADDELL & CO., Montreal,
AGENTS FOR UNITED STATES AND CANADA
BUDD & ELLIS, 105 John St., N. Y., and 10 Oliver St., Boston,
SOLE SALE AGENTS FOR THE UNITED STATES.



J. G. BRILL & CO.,
PHILADELPHIA
BUILDERS OF
RAILWAY AND TRAMWAY CARS.



THE BUFFALO NUT AND BOLT COMPANY
(LIMITED),
MANUFACTURERS OF
Hot Pressed Nuts, Bolts, Washers, Rivets, Etc.,
NO. 226 OHIO STREET,
BUFFALO, N. Y.
AUG. DUCKWITZ, President. WM. F. DUCKWITZ, V. P. and Manager. F. H. DUCKWITZ, Sec. and Treas.

GEO. KINGSLAND, Prest. F. GILLESPIE, Supt.
CENTRAL UNION BRASS CO.,
MANUFACTURERS OF
BRASS CAR TRIMMINGS,
AND ALL KINDS OF
Brass Castings, Bronze, Babbitt Metals, Solder, etc. Brass Journal Bearings a Specialty.
811 North Second St., ST. LOUIS, MO.

SOUTHERN STATES COAL, IRON & LAND COMPANY (LIMITED),
SOUTH PITTSBURG, TENN.,
BUILDERS OF FREIGHT CARS.

MICHIGAN CAR COMPANY,
JAMES McMILLAN, President.
HUGH McMILLAN, V. Pres. and Gen. Manager.
JAMES McGREGOR, General Superintendent.
Manufacturers of
RAILROAD CARS,
H. W. DYAR, Assistant Mana
W. K. ANDERSON Treasurer
JOSEPH TAYLOR, Secretary
OFFICE: NO. 2 MOFFAT BLOCK, DETROIT, MICH.

DETROIT CAR WHEEL COMPANY,
Manufacturers of
LOCOMOTIVE AND CAR WHEELS. RAILROAD AND OTHER CASTINGS,
JAMES McMILLAN, President.
HUGH McMILLAN, V. Pres. and Gen. Manager.
DETROIT, MICH.
J. H. WHITING, Superintendent.
W. K. ANDERSON, Secretary and Treasurer.

BAUGH STEAM FORGE COMPANY,
Manufacturers of all Descriptions of
CAR AND DRIVING AXLES, COUPLING LINKS AND PINS, SHAFTINGS, DRAW BARS, ETC.
JAMES McMILLAN, President.
HUGH McMILLAN, V. President and Treasurer.
JOHN B. BAUGH, General Manager.
Works on River Road, Below City,
DETROIT, MICH.
SAMUEL A. BAUGH, Superintendent.
W. K. ANDERSON, Secretary.

DETROIT IRON FURNACE COMPANY.
LAKE SUPERIOR CHARCOAL PIG IRON,
FOR CAR-WHEEL AND MALLEABLE USE.
JAMES McMILLAN, President.
HUGH McMILLAN, Vice-Pres. and Treas.
DETROIT, MICH.
LEE HURT, Manager.
E. C. WETMORE, Secretary.

AJAX METALS,

Especially Adapted for LOCOMOTIVE, CAR, ROLL-NECK and MACHINERY BEARINGS, and for Pump-Rods, Valves Plungers, etc., for Mine Use where sulphurous water and acids are found

LETTERS PATENT have not been taken out, so that any one using our goods runs no risk of being associated with any lawsuit. **NO INTERFERENCE** can be filed against the use of Ajax Metals on the contrary, letters of recommendation from the leading steel and iron mills, foundries and machine shops of this country are shown upon application. Also reports of tests as made by MASTER CAR-BUILDERS and MASTER MECHANICS, who are acknowledged AUTHORITY. Full information given on application to

EO. B. CUSHING, 224 Front St., New York; THOMPSON, EPPING & CARPENTER, Pittsburgh; N. F. THOMPSON, Savannah, Ga. POST & CO., Cincinnati; M. M. BUCK & CO., St. Louis.

THE ELKINS MANUFACTURING AND GAS CO., 617 and 619 Arch Street, Philadelphia, Sole Manufacturers of AJAX METALS.

1882.--IMPROVED IRON STEAM SHOVEL AND DERRICK.

MANUFACTURED BY THE

INDUSTRIAL WORKS, - - BAY CITY, MICH.

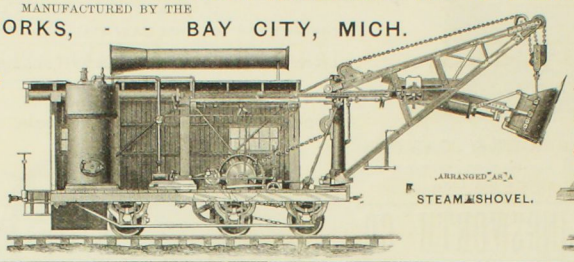
TURN-TABLES

OF

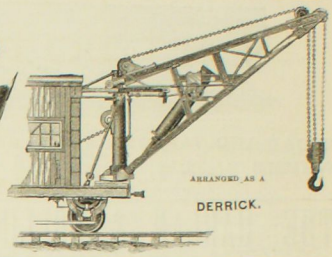
Iron and Wood.

C. R. WELLS, Sec'y. Bay City, Mich.

McMANN & BRO., 58 Gold st., N. Y.

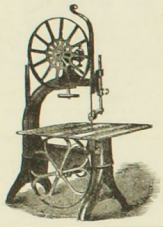


ARRANGED AS A STEAM SHOVEL.



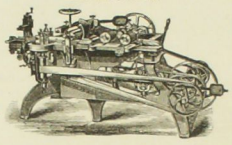
ARRANGED AS A DERRICK.

MANUFACTURERS OF WOOD-WORKING MACHINERY.



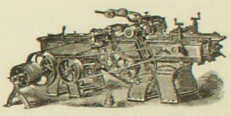
BAND SAW.

The Latest Improved MACHINERY for Railroad Car Shops.



OUTSIDE MOLDER.

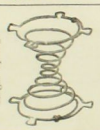
Planers, Vertical Car Tenoners, Gaining, Tenoning, Rotary Mortising Machines.



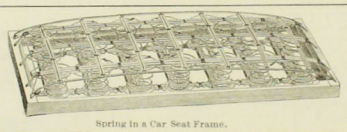
INSIDE MOLDER.

C. B. ROGERS & Co., MANUFACTORY, NORWICH, CONN. WAREROOMS, 109 Liberty St., New York.

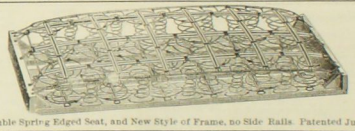
BUSHNELL'S PATENT SPRINGS for Car Seats Backs, Berths and Mattresses. Best in the *world*. Adopted and used by nearly all of the leading Railroad and Car Builders in the United States and Canada.



Single Spring.



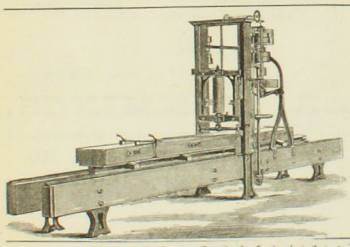
Spring in a Car Seat Frame.



Double Spring Edged Seat, and New Style of Frame, no Side Rails. Patented June, 1882.

E. L. BUSHNELL PATENTEE AND MANUFACTURER Poughkeepsie, N. Y.

Circulars, References, Price List and Samples Free.



HORACE A. RICHARDSON,

MANUFACTURER OF

IMPROVED WOOD WORKING MACHINERY.

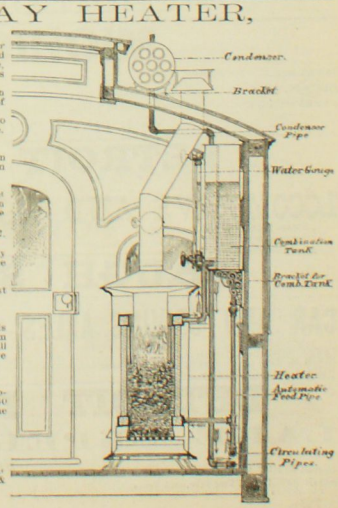
DANIELS PLANING MACHINES A SPECIALTY.

MANUFACTORY: WORCESTER, MASS,

UNITED STATES OF AMERICA.

THE JOHNSON PATENT RAILWAY HEATER,

For Generating Steam, and for Steam and Water Circulation,



Forming two independent currents, hot water for moderate weather, reinforced by steam for severe cold. Heating capacity estimated at 125 *per cent. over any other apparatus in use, with one-third less fuel.* Noiseless and Non-explosive in operation, constructed without Valves or Checks, and requiring no mechanical arrangement for safety,—a device with open pipes. Steam circulation without pressure, affording heat free from smoke, gases, or the objectionable odor arising from over-heated steam. The invention consists in the construction and arrangement of mechanical devices and philosophical combinations through which the results are obtained. The accompanying drawing will place the system in an intelligible form.

The substantial construction and guarded arrangement of the *Johnson Heater* ensures safety from fire or explosion to a far greater degree than by any device heretofore produced. The success of this system of heating is now fully demonstrated by its application upon a large number of passenger cars on the leading railroads in New England.

The official communications which are herewith presented give indisputable evidence of this fact, and are in themselves sufficiently explicit to require no further comment in evidence of the value of this improvement in point of comfort to the passenger and economy for those who adopt its use.

COMMONWEALTH OF MASSACHUSETTS. BOARD OF RAILROAD COMMISSIONERS, No. 7 PEMBERTON SQUARE, BOSTON, June 24, 1882.

CHARLES F. CHOATE, Esq., *Pres. Old Colony R. R. Co.:*

Dear Sir:—The Board has received yours of the 22d inst., asking approval of the Safeguards for protection against fire furnished by Johnson Railway Heater. The Commissioners have examined the Johnson Heater, and at a meeting of the Board this day it was voted that the "Johnson Railway Heater," for warming passenger cars, be and is hereby approved. Yours respectfully, WM. A. CRAFTS, *Clerk and Sec.*

OLD COLONY RAILROAD CO., BOSTON, June 20, 1882.

ROBERT JOHNSON, *Treas. Johnson Heater Co.:*

Dear Sir:—We have used the Johnson Heater for our passenger cars the past three years. They have given perfect satisfaction in every respect during the extreme cold weather. They kept our cars warm as we desired them to be. I never have heard a word in regard to the heaters, except in commendation of them. We have eighty-two of them in our cars, and shall add more this fall. I consider the new Heater very much superior to the old. It works perfectly. Respectfully yours, A. GLEASON, *Master Car-Builder*

MAINE CENTRAL RAILROAD, PORTLAND, ME., June 19, 1882.

[GEO. E. B. JACKSON, *Pres.*, PAYSON TUCKER, *Supt.*]

ROBERT JOHNSON, *Treas. Johnson Railway Heater Co.:*

Dear Sir:—We have used the Johnson Heater in our passenger cars for the past two years. They have given perfect satisfaction in every respect. During the extreme cold weather of last winter they did all that you claim for them, and our cars during that time were as warm as we desired to have them. Yours truly, PAYSON TUCKER, *Supt.*

OLD COLONY RAILROAD, SUPERINTENDENT'S OFFICE, BOSTON, MASS. June 22, 1882.

ROBERT JOHNSON, *Treas. the Johnson Railway Heater Co.:*

Dear Sir:—We have over eighty of your heaters in our passenger cars, and they give entire satisfaction, and during the cold weather of the last winter the cars furnished with them were kept warm and comfortable. Very truly yours, J. R. KENDRICK, *Sup'rintendent.*

OLD COLONY RAILROAD, OFFICE OF PASSENGER TRANSPORTATION MASTER, BOSTON, Jan. 11, 1882.

ROBERT JOHNSON, Esq., *Treasurer Johnson Heater Co.:*

Dear Sir:—It gives me pleasure to testify to the excellence of the "Johnson Heater," which is in use on this road for the third winter. It is absolutely non-explosive, a great saver of fuel, and more easily managed than an ordinary coal stove. The temperature of the cars is uniform throughout, and gives great satisfaction to the officers and patrons of the road. We are using over fifty of them at the present time, and we shall introduce them in fifteen new cars now building, and are putting them in the older ones as fast as opportunity presents. The larger number of the cars referred to seat seventy-four passengers. Very sincerely yours, J. C. SANBORN, *Passenger Transportation Master*

EASTERN RAILROAD COMPANY, OFFICE OF MASTER OF TRANSPORTATION, BOSTON, March 23, 1882.

ROBERT JOHNSON, Esq., *Treasurer Johnson Heater Co.:*

Dear Sir:—It gives me pleasure in testifying to the excellence of the "Johnson Heater," which we now have in use on this road. It is absolutely non-explosive, a great saver of fuel, and more easily managed than an ordinary coal stove. *The Thermometer has shown 60° within 40 minutes after the fire was started.* The temperature of the cars is uniform and gives good satisfaction to the patrons of the road. We have at the present time twenty-six of them, and shall soon add more. Yours truly, D. W. SANBORN, *Mas. Trans.*

THE JOHNSON RAILWAY HEATER COMPANY,

Office, No. 8 Exchange Place, Boston, Mass.

JOHN WOOLDRIDGE, President. J. W. PICKERING, Secretary. ROBERT JOHNSON, Treasurer & General Manager.

The Heater can be seen at the Old Colony, Boston & Providence, Fitchburg, Boston & Maine, and Eastern railroads, in Boston; also, at the Maine Central Railroad, in Portland, Maine, and at SMITH & ANTHONY'S, Nos. 52 & 54 Union Street, Boston; Boston & Albany, New York, Lake Erie & Western, Michigan Central, Central Vt., Providence and Worcester, and at Pullman Palace Car Works, Pullman, Ill.

Workshops, No. 30 Union Park Street, Boston, Mass.

HALE & KILBURN MANUFACTURING COMP'Y,

48 AND 50 NORTH SIXTH STREET, PHILADELPHIA, PA.,

EXTENSIVE MAKERS OF

PATENTED CAR SEATS AND SPRINGS.

ESTIMATES, CIRCULARS AND SAMPLES FURNISHED ON APPLICATION.

REFERENCES.

N. Y., C. & H. R. R. CO.
N. Y. ELEVATED R. R.
ILL. CENTRAL R. R.
PULLMAN P. C. CO.
PENN. R. R. CO.
N. Y. & N. ENG'D R. R.
BALT. & O. R. R.
AND ONE HUNDRED OTHERS.

ELASTIC SLAT SEAT.

RATTAN SPRING SEAT.

SPRING EDGE SEA

PARLOR CAR CHAIR

INDEX TO ADVERTISEMENTS IN THE National Car-Builder.

Air Brakes: PAGE.
Eames Vacuum Air Brake Co., 15 Gold st., N.Y. xiv
The American Brake Co., St. Louis, Mo xxii
Westinghouse Air Brake Co., Pittsburgh, Pa. (cover) i

Axles:
Baugh Steam Forge Co., Detroit, Mich. ix
Lake Erie Iron Co., Cleveland, O. xxiv
Midvale Steel Co., Philadelphia vii
New Albany Steam Forge, New Albany, Ind. vii
Pittsburgh Forge & Iron Co., Pittsburgh, Pa. i
Wilson, Walker & Co. (Limited), Pittsburgh, Pa. xviii

Bell Cord and Couplings:
Wellington Bros. & Co., Agents, Boston, Mass. vii

Belting:
Shulzt Belting Co., St. Louis, Mo v

Boiler Covering:
Bradley Manufacturing Co., Chicago, Ill v

Boiler Testing Apparatus:
Rue Manfg. Co., Phil., Pa. xv

Boiler Plate:
Phillips, Nimick & Co., Pittsburgh, Pa xv

Bolts:
Buffalo Nut & Bolt Co., Buffalo, N. Y. ix
Elba Iron & Bolt Co., Pittsburgh, Pa. vii
Hoopes & Townsend, Philadelphia, Pa. xxiv
Plumb, Burdict & Barnard, Buffalo, N.Y. (cover) 4
J. Noyes Smith & Co., Cleveland, Ohio xiii

Bolt Cutters:
Howard Iron Works, Buffalo, N. Y. xv

Books:
National Book Co., New York iv

Brushes:
Stewart Bros. Co., Pittsburgh, Pa. ..... (cover) 1

Carbons (Electric Lamps):
Cleaver, C. S., Chicago, Ill. xiii

Cars:
Allison, W. C., Philadelphia, Pa viii
Billmeyer & Small Co., York, Pa viii
Bradley Car Works, Worcester, Mass. viii
Brill, J. G. & Co., Philadelphia, Pa. ix
Canton Car Co., Canton, O viii
Dauphin Car Works, Duphin, Penn viii
Erie Car Works, Erie, Pa. (Limited) ix
Gill Car Manufacturing Co., Columbus, O. viii
Harlan & Hollingsworth Co., Wilmington, Del. ix
Harrisburg Car Mfg. Co., Harrisburg, Pa. viii
Jones Car Manfg. Co., Schenectady, N. Y. ix
Lafayette Car Works viii
Lehigh Car, Wheel and Axle Works, Catasauqua, Pa. ix
Litchfield Car and Machine Co., Litchfield, Ill. viii
Michigan Car Co., Detroit, Mich ix
Middletown Car Works, Middletown, Pa viii
Pardee Car Works (limited), Watsontown, Pa. viii
Peninsular Car Works, Detroit, Mich viii
Pennock Bros., Minera, Ohio viii
John Stephenson Co. (Limited), New York, N.Y. viii
Southern States Coal, Iron & Land Co. (Limited), South Pittsburg, Tenn. ix
U. S. Car Company, Boston, Mass xx
Wason Car & Foundry Co., Chattanooga, Tenn. viii
Wason Manufacturing Co., Springfield, Mass. xxii
Youngstown Car Works, Youngstown, Ohio ... viii

Car Brake Shoes:
Congdon Brake Shoe Co., Chicago, Ill. xxiv
Standard Brake Shoe Co., Ft. Wayne, Ind. xxii

Car Brass Grinding Machine:
The Tanite Co., Stroudsburg, Pa. ..... (cover) 4

Car Couplings:
Perry's Safety Car Coupling, Chicago, Ill. xxii

Car Glass:
Holbrook Bros., 87 Beekman st., N.Y. (cover). 1

Car Hardware:
Union Brass Manf. Co., Chicago, Ill ii

Car Heaters:
Johnson Railway Heater Co., Boston, Mass. x
Union Brass Co., Chicago, Ill. ii

Carpets.
Sloane, W. & J., New York iv

Car Pushers:
Dwight, E. P., 407 Library st., Phila, Pa. v
Penfield Block Co., Lockport, N. Y. xxii

Car Roofing:
Empire Car Roofing Co., Chicago, Ill.... (cover) 1

Car Seats:
Buntin, Geo. & Co., Philadelphia, Pa. viii
Gardner & Co., Canal st., New York, N. Y. ... xviii
Hale & Kilburn Mfg. Co., Phila., Pa. xi
Union Brass Co., Chicago, Ill. ii

Car Seat Springs:
Bushnell, E. L., Poughkeepsie, N. Y. x

Car Springs:
Andrews & Clooney, New York ..... (cover) 3
Chicago Tyre & Spring Works, Chicago, Ill. (cover) 3
Cliff & Righter Co. (limited) New York, N. Y. ..... (cover 1) x
Davis, A. B., Car Spring Co. (Limited), Phila., Pa. ..... (cover) 3
Diamond State Car Spring Works, Wilmington, Del. ..... (cover) 3
Detroit Car Spring Co., Detroit, Mich. (cover) 3
French, A. & Co., Elliptic, Pittsburgh, Pa. i
French Spiral Spring Co., Pittsburgh, Pa. (cover) 2
Hebbard Car Spring Co., Knoxville, Tenn. (cover) 3
Jeffries, J. & Son, Philadelphia, Pa. ..... (cover) 3
Keystone Spring Works, Philadelphia, Pa. xvi
National Car Spring Co., 13 Barclay st., N. Y. (cover 1 and xviii and cover) 3
Pickering, C. W. & Co., Philadelphia, Pa. (cover) 3
U. S. Concave Spring Co., 21 Cortlandt st., New York ..... (cover) 3

Car Trucks:
Thielsen Truck Co., Chicago, Ill. vii

Car Truck Channels:
Andrew Kloman, Pittsburgh, Pa. ..... (cover) 1

Car Wheels:
Allen Paper Car Wheel Co., 240 B'way, N. Y. ... vi
Bass Foundry & Machine Works, Fort Wayne, Ind. vii
Boston Standard Wheel Co., Boston, Mass. vii
Bowler & Co., Cleveland, O vi
Budd & Ellis, New York and Boston ix
Cayuta Wheel & Foundry Co., Waverly, N. Y. vii
Davenport, Fairbairn & Co., Erie, Pa. vi
Detroit Car Wheel Co. ix
Gill Car Manufacturing Co., The, Columbus, O. viii
Griffin Car Wheel Co., Detroit, Mich. ..(cover) 4
Griffin & Wells Foundry Co., Chicago, Ill. (cover) 4
Lehigh Car, Whl & Axle Wks, Catasauqua, Pa. ix
Lobdell Car-Wheel Co., Wilmington, Del. vi
Maher & Brayton, Cleveland, O vi
Mowry Car Wheel Works, Cincinnati, O vii
Paige's Wrought Metal Car Wheel Co., Springfield, Mass. vii
Ramapo Wheel & Foundry Co., Ramapo, N. Y. vi
Russel Wheel & Foundry Co., Detroit, Mich. viii
Taylor Iron Works, High Bridge, N. J. vii
Wason Mfg. Co., Springfield, Mass. xxii
Whitney, A. & Sons, Philadelphia, Pa. vi

Chains:
Union Chain Works, Pittsburgh, Pa. xxii

Chilled Car-Wheel Grinding Co:
Carson, Nev., Chicago, Ill., and Astor House, New York, N. Y. vi

Consulting & Inspecting Engineer:
Sharp, Thos. R., 115 Broadway, N. Y. xiii

Curled Hair and Glue:
Baeder, Adamson & Co., New York.... (cover) 4

Deflectors:
Globe Ventilator Co., Troy, N. Y. xxiii

Draughtsman's Materials:
Ketchum, Chas. F. & Co. xxiii

Draw-Bars:
Pittsburgh Forge & Iron Co i
Safford, J. B., Buffalo, N. Y. xxiv
Wilson, Walker & Co., Pittsburgh, Pa. (limited) xviii

Drills:
Hilles & Jones, Wilmington, Del xxii

Emery:
Emery, Henry A., Boston, Mass vii

Emery Wheels:
Diamond Emery Wheel and Machine Co., Providence, R. I. ..... (cover) 4
The Tanite Co., Stroudsburg, Pa. ..... (cover) 4

Engraving:
Photo-Engraving Co. (New York, N. Y.) xxii

Engines:
Cammeyer & Sayer, New York, N. Y. v
Westinghouse Machine Co., Pittsburg, Pa. (cover 1 and v

Excavators:
Industrial Works, Bay City, Mich. x

Exposition:
Nat. Expo. of R. R. Appliances iii

Flexible Shafts:
Stow Flexible Shaft Co. Limited. Philadelphia, Pa. ..... (cover) 2

Frogs & Crossings:
Elliot, H. & H., East St. Louis, Ill. xx
Union Switch & Signal Co., Pittsburgh, Pa. (cover) 1

Glass:
Holbrook Bros., New York, N. Y. ..... (cover) 1

Hand-Car:
Jeffrey's R. R. Velocipede, Chicago, Ill. xxiv
Sheffield Velocipede, H. W. Peabody & Co., Boston, Mass. iv

Hoisting Engines and Boilers:
Worthington, H. R., Chicago, Ill. ..... (cover) iii

Hydraulic Jacks:
Dudgeon, R., 24 Columbia st., New York (cover) 4

Inks (Writing):
Carter, Dinsmore & Co., 36 Dey st., N. Y. (cover) 2

Injectors:
The Hancock Inspirator Co., Boston, Mass. ... vii
Nathan & Dreyfus "Monitor," New York xv
Nat. Tube Wks., New York, Boston and Chic xiv
Rue Manfg. Co., Philadelphia, Pa. xvii
Sellers, Wm. & Co., Philadelphia, Pa. ..... (cover) 2

Interlocking Switches:
Union Switch & Signal Co. ..... (cover) 1

Iron Castings:
Springfield Foundry Co., Springfield, Mass. (cover) 4

Iron Pipe:
Crane Bros. Manufacturing Co., Chicago, Ill. ... viii
National Tube Works, Boston, Mass. and McKeesport, Pa. xiv

Journal Bearings:
Central Brass Co., St. Louis, Mo xi
Bedrick, Wm. S. & Co., Pittsburgh, Pa. xxiv
Elkins Manufacturing and Gas Co., Philadelphia, Pa. x
Fitzsimmons, J. (Manganese Bronze), Pittsburgh, Pa. viii
Hopkins, D. A., 113 Liberty st., New York xviii
Leroy Journal Bearing Co., New York (cover) 2
Meneely, George R. & Co., West Troy, N. Y. ..... (cover) iii
Phosphor-Bronze Smelting Co. (Limited), Philadelphia, Pa. xv
Shiner, G. J. & Co., Freemansburg, Pa iii

Journal Box:
Ramapo Wheel & Foundry Co., Ramapo, N.Y. iii

Journal Box Lids:
Hewitt Box Lid Cover Co., Chicago, Ill. xv

Leather:
Yandell, C. R. & Co., New York ..... (cover) 1

Lifting Jack:
Joyce, Cridland & Co., Dayton, O. xxii

Linseed Oil:
Jewett, John & Sons, New York, N. Y. xviii

Locomotives:
Baldwin Loco. Works, Philadelphia, Pa. xiv
Canadian Locomotive & Engine Co (Limited), Kingston, Ont. xiv
Manchester Loco. Works, Manchester, N. H. xiv
Pittsburgh Loco. & Car W'ks., Pittsburgh, Pa. xiv
H. K. Porter & Co., Pittsburgh, Pa. xvi
Rogers Loco. & Mach. W'ks, Paterson, N. J. ... xiv
Schenectady Locomotive Works, N. Y. xiv

Locomotive Tubes:
Nat. Tube Works, Boston, Chicago and N. Y. xiv

Locomotive Tyres:
Chicago Tyre & Spring Works, Chicago, Ill. xxiv

Locomotive Turntables:
Wilcox & Stock, Toledo, O. iv

Lubricants:
American Lubricating Co., Philadelphia, Pa. ... v
Inland Oil Co., Cincinnati, Ohio xx
Mica Manf'g Co., Cleveland and New York ... v
Middleton, A., 945 Ridge ave., Philadelphia, Pa. v
Urquhart, John S., 46 Cortlandt St., N. Y. ... xv

Lumber:
Bell, W. C. & Bros., Memphis, Tenn viii
Case, W. V., Lumber Co., Philadelphia, Pa. ... i
Genet & Silver, 117 Temple Court Building, N.Y iii
Vanderbilt & Hopkins, 120 Liberty st., N. Y. v

Lumber Dryer:
Invincible Lumber Dryer, Erie, Pa. iv

Machinists Tools:
Bickford, H., Cincinnati, Ohio ..... (cover) iv
Flanders, L. B., Machine Works (Pedrick & Ayer), Philadelphia, Pa. xv
Hilles & Jones, Wilmington, Del xxii
Niles Tool Works, Hamilton, O. ..... (cover) 4
Sellers, Wm. & Co., Philadelphia, Pa. v

Mahogany, Fancy Woods & Veneers:
Albro Co., The E. D., Cincinnati, O. xvi
Allen, James T., 235 Canal st., N. Y. xvii
Clark & Smith, Boston, Mass. viii
Graham, John R., New York ..... (cover) iv
Houghton, C. C. & Sons, 6 Howard st., New York viii
Palmer, Parker & Co., Boston, Mass. ..... (cover) 1
Rayner, A., New York City xii
Read, Geo. W. & Co., 180 Lewis st., N. Y. v
Uptegrove, Wm. E. & Bro., New York City ... xxiv

Malleable Iron Castings:
Penn Malleable Iron Co. ..... (cover) 1

Marqueterie:
Bernard, J., 161 Greene st., N. Y. ..... (cover) 1

Matching Heads:
Skinner & Co., Milton, Pa. iii

Mineral Wool:
U. S. Mineral Wool Co., New York City xi

Nails:
American Wire Nail Co., Covington, Ky (cover) 1

Oils:
Galena Oil Works (Limited), Franklin, Pa. v
Signal Oil Works, Franklin, Pa. v

Oil-Box Covers:
Vulcanized Fibre Co., Wilmington, Del xxii

Paints:
Billings, Taylor & Co., Cleveland, O. xiii
Devoe, F. W. & Co., New York, N. Y. xvi
Iron Clad Paint Co., Cleveland, O. ..... (cover) 3
Lowe's Metallic Paint Co., Chattanooga, Tenn. xvii
Massury, John W. & Son, New York xiii
Mound City Paint & Color Co., St. Louis, Mo. iv
Prince Mfg. Co., 71 Maiden Lane, N. Y. ..... (cover) 2

Pig Iron:
Detroit Iron Furnace Co., Detroit, Mich. ix
Ross, Jas. W., 36 Dearborn st., Chicago, Ill. ... xv

Portable Drills:
Stowe Flexible Shaft Co. (Limited), Phila., Pa. xv

Power Hammers:
Bradley & Co., Syracuse, N. Y. xv
Forsaith, S. C. & Co., Manchester, N. H. xv
Long & Allstatter Co., Hamilton, O. vii

Power Moulding Machines:
Drummond Manfg. Co., Louisville, Ky xxii

Power Punches, Shears and Hammers:
Hilles & Jones, Wilmington, Del xxii
The Long & Allstatter Co., Hamilton, O. vii

Publishers:
Builder and Wood Worker, New York, N. Y. xxiv

Pumps:
Cope & Maxwell Mfg. Co., Hamilton, O. v
Crane Bros. Mfg. Co., Chicago, Ill. v
Delamater Iron Works, New York xiii
McGowan, John H. Co., Cincinnati, O. ..... (cover) 3
Smith, Vale & Co., Dayton, O. iv
Valley Machine Co., Easthampton, Mass. iii
Worthington, H. R., 239 B'way, N. Y. (cover) 3

Railroad Supplies:
Central Brass Co., St. Louis, Mo. ix
Iron Cliff Scrap Metal Co., Pittsburg, Pa. xxiv
Leach, H. L., Boston, Mass v
Ross, Jas. W., 36 Dearborn st., Chicago, Ill. ... xv
Stewart & Lawson, Cincinnati, O. xxiv
Sullivan, J. E. & Co., Pittsburgh, Pa. v
Tillotson, L. G. & Co., 5 and 7 Dey st., N. Y., iv
Union Brass Co., Chicago, Ill. ii

Railway Car and Locomotive Forgings:
Pittsburgh Forge & Iron Co. i
Wilson, Walker & Co., Pittsburgh, Pa. (limited xviii

Railway Equipment:
Patten, Jas. T., N. Y. xiii
The Railway Equipment Co., Boston, Mass. xxii

Railway Fastenings:
Morris Sellers & Co., Chicago, Ill. iii

Ratchet Drill:
E. G. Felthousen, Buffalo, N. Y. ..... (cover) 2

Rochester Machinery Manufacturing Co.:
Wormer, G. S. & Sons, Chicago, Ill. ....(cover) iii

Roofing:
Moser & Thompson, Cleveland, O. ....(cover) 2
Porter Iron Roofing Co., Cincinnati, O. iii

Safety-Nut:
Atwood Safety-Nut Co., Springfield, Mass. vii

Safety Valves:
Ashton Valve Co., Boston, Mass. xiv

Sand Paper and Emery Cloth:
Baeder, Adamson & Co., New York N.Y. (cover) 4

Sash Balances—"Anderson's:"
Gardner, O. K., Pittsburgh, Pa. v

Sash Holder and Lock:
Ornsby Sash Holder Co., Boston, Mass. xxiv

Saw Setting Machines:
Amesbury, G. W. & Co., Philadelphia, Pa. xx

Scrap Iron Dealers:
Iron City Scrap Metal Co., Pittsburgh, Pa. xxiv

Shafting:
Sellers, Wm. & Co., Philadelphia, Pa. v

Sheet-Iron:
Thomson, A. A. & Co., Water street, N. Y. xv
Wood, W. D. & Co., Pittsburgh, Pa. xv

Sligo Stay-Bolt Iron:
Phillips, Nimick & Co., Pittsburgh, Pa. xv

Snow Plow and Track Cleaners:
Day, Augustus, Detroit, Mich. ..... (cover) 1

Stand Pipes for Water Stations:
Poage, John N., Cincinnati, Ohio xxiv
Pratt, Jas. A. & Co. xxiv

Steam Gages and Valves:
Crosby Steam Gage & Valve Co., Boston, Mass. xxii

Steel:
Chrome Steel Works, Brooklyn, N. Y. (cover) 1
Crucible Steel Co., Cleveland, O. xxiv
Detroit Steel Works, Detroit, Mich. ....(cover) 3
Midvale Steel Co., Philadelphia, Pa. vii

Steel Castings:
Chester Steel Castings Co., Philadelphia, ... 2
Eureka Cast-Steel Co., Philadelphia, Pa. iv

Steel Tires:
Midvale Steel Co., Philadelphia, Pa. vii
Standard Steel Works, Philadelphia, Pa. vi

Switch Stands:
Union Switch & Signal Co., Pittsburgh, Pa. (cover) 1

Switches:
Union Switch & Signal Co., Pittsburgh, Pa. (cover) 1

Tackle Blocks:
Penfield Block Co., Lockport, N. Y. xxv

Tank Valves:
Poage, John N., Cincinnati, Ohio. xxiv

Taps and Dies:
The Pratt & Whitney Co., Hartford, Conn. .. vi

Tripoli:
Georgia Mining & Mfg. Co., New York, N. Y. xx

Twist Drills:
Morse Twist Drill and Machine Co., New Bedford, Mass. iv

Varnishes:
Babcock, John & Co., Boston, Mass. xii
Berry Brothers, Detroit, Mich. xvi
Bigelow, Moses & Co., Newark, N. J. xii
Billings, Taylor & Co., Cleveland, O. xiii
Brooks, Clarence & Co., New York xiii
Burbank, Ryder & Damon, Boston, Mass. (cover) 1
De Groyer, Chicago and Troy xiii
Devoe, F. W. & Co., New York xii
Massury, John W. & Son, New York xiii
Murphy & Co., N. Y. City and Cleveland, O. ... xii
Parrott Varnish Co., Bridgeport, Conn. (cover). 4
Shipman & Bolen, Newark, N. J. xiii
Valentine & Co., New York, N. Y. xii

Ventilators:
Adams & Westlake Manufacturing Co., Chicago, Ill. xxii
Globe Ventilator Co., Troy, N. Y. xxiii

Vise:
Eagle Anvil Works, Trenton, N. J. iv

Waste (Cotton Seed Hulls):
National Ry Patent Waste Co., New York xxii

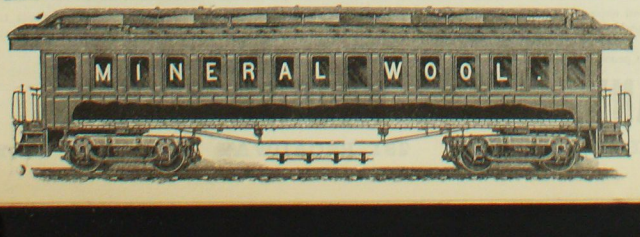
Water Columns:
Poage, John N., Cincinnati, Ohio xxiv

Water Supply:
Eclipse Wind Engine Co., Beloit, Wis v

White Lead:
Lewis, J. T. & Bros., Philadelphia, Pa. v

Wire Netting:
E. Holenshade, Chicago, Ill. 2

Wood-Working Machinery:
Benjamin, Fischer & Mallery, Chicago, Ill. ... xviii
Bentel, Margedant & Co., Hamilton, O. xxii
Buck, Martin, Lebanon, N. H. xxii
Cordesman & Egan Co., Cincinnati, O. ix
Fay, J. A. & Co., Cincinnati, O. xiii
Forsaith, S. C. & Co., Manchester, N. H. xxii
Goodell & Waters, Philadelphia, Pa. x
Lane, Bodley & Co., Cincinnati, O. vii
Lee, H. A., Worcester, Mass. xv
Richardson, H. A., Worcester, Mass. x
Rogers, C. B. & Co., Norwich, Conn. x
Sollitome Machine Co., Fitchburg, Mass. xx
Smith, H. B. Machine Co., Philadelphia, Pa. .. iv
Witherby, Rugg & Richardson, Worcester, Mass. ..... (cover) 4



As a filling for floors of passenger cars, this materia prevents the loss of heat, deadens the sound and lowers the center of gravity of the car. More effective than shavings of double the thickness and entirely fireproof. Valuable also for covering all heated surfaces. Only $6 per 100 sq. feet, filling 3 inches thick. Sample and circular free by mail.

U. S. Mineral Wool Co.,

16 CORTLANDT ST., NEW YORK.

F. W. DEVOE & CO.,

MANUFACTURERS OF

DRY COLORS, COACH AND CAR COLORS IN OIL AND JAPAN,

Special Colors Compounded to Match any Desired Shade.

FINE RAILWAY VARNISHES AND JAPANS FOR PASSENGER COACHES.

Also Freight Car, Caboose and Bridge Paints Ready for Use. Fine Brushes for Railroad Car and Coach Painting. All Kinds of Painters' Supplies and Artists' Materials.

Railroad Companies will save themselves great trouble in painting by allowing F. W. Devoe & Co. to prepare their Passenger and Freight Car Colors. This will insure DURABILITY, UNIFORMITY and ECONOMY. As we manufacture from the crude materials, which are the component parts of any shade, we understand better their chemical relationship, when in combination, than can be possible to those who simply buy their dry materials and then grind them. SEND FOR CATALOGUES AND LISTS OF SAMPLE COLORS.

F. W. DEVOE & CO.,

Cor. Fulton and William Streets, NEW YORK.

MANUFACTURERS OF RAILWAY CAR VARNISHES.

JOHN BABCOCK & Co

NO. 2 LIBERTY SQUARE BOSTON, MASS.

ESTABLISHED 1832.

FINE COACH AND CAR

VARNISHES

"THE STANDARD FOR QUALITY."

VALENTINE & COMPANY,

MAKERS OF

TRADE VALENTINES VARNISHES MARK.

NEW YORK.

245 BROADWAY.

INCORPORATED 1882.

BRANCHES:

CHICAGO, ILL., 68 Lake Street.

BOSTON, MASS., 153 Milk Street.

PARIS, FRANCE, 91 Champs Elysees.

ESTABLISHED 1845.

MOSES BIGELOW & CO., NEWARK, N. J.

RAILWAY VARNISHES

J. RAYNER,

IMPORTER AND DEALER IN

MAHOGANY

AND ALL FOREIGN AND DOMESTIC

CABINET WOODS.

SPECIAL INDUCEMENTS TO

CAR BUILDERS.

Mills, Yards and Wharf:

Foot Houston Street, E. R., New York.

THE A B C SYSTEM OF PAINTING

Is the SUREST, the SAFEST, the MOST RELIABLE and MOST DURABLE process of painting Passenger Cars and Engines ever brought to the attention of Railway Managers.

We know very well that to talk of anything in this apparently boastful way is apt to invite distrust from practical men who measure the value of their adjectives, but

THE A B C SYSTEM HAS NEVER YET RECORDED A FAILURE ON RAILWAY WORK.

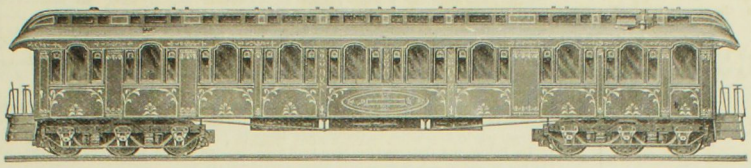
IT enables a Superintendent to *know to a day* just when he can expect his cars from the paint shop. IT *reduces* the average *time* of painting. IT *supports* the *olor* and *varnish better* than any other method, and is *more durable* and *more uniform*, and *no more expensive* than any other good process. IT is now in use on the eading trunk lines, and in the best shops.

Send for our pamphlet, "HOW TO PAINT," which describes the process at length.

MURPHY & COMPANY, - - VARNISH MAKERS,

CANAL AND HARRISON STS., CLEVELAND OHIO. 231 BROADWAY NEW YORK CITY.

THE NATIONAL CAR-BUILDER.



DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XIV
NUMBER 1.

JANUARY, 1883.

SINGLE NUMBERS, TEN CENTS.
$1.00 PER ANNUM.

Miscellaneous Items.

THE Peninsular Car Works, at Adrian, Michigan, have built 5,500 cars during 1882.

THE Indianapolis Car Works are to build 250 coal cars of 40,000 pounds capacity for the Vandalia Line.

THE Chicago & Northwestern Railway Co. has commenced the building of 10 eight-wheel road engines and 20 passenger coaches.

THE Car Works of McKee & Fuller, at Catasauqua, Pa., are turning out ten cars a day on a contract that will keep the works busy for several months.

THE Lafayette (Ind.) Car Works have contracts in hand for 1,000 cars for the Rochester & Pittsburg, and 2,900 for the New York, Chicago & St. Louis roads.

THE Chicago, Rock Island & Pacific road has 307 engines. Six new ones are nearly completed, and six more are soon to be built. The company has built 25 new engines during the past year.

THE Schenectady Locomotive Works, in Schenectady, N. Y., have received large additional orders for locomotives for the New York Central & Hudson River and the Canada Southern roads.

THE name of the St. Louis Car Wheel Co. has been changed to "Dutro Car Wheel Co." The office of the company is at 207 North Third street, St. Louis, Mo. T. C. Dutro is President.

A MODEL of the Burton stock car is exhibited in the window of a railroad office in Boston. It contains the figures of 18 cattle standing in their stalls, and shows the method of feeding, watering, etc.

AT the new Tacoma shops of the Northern Pacific road, 100 stock, 300 flat, 250 box, 6 baggage and mail and 12 caboose cars are to be built at once; also 100 box and 50 flat cars under previous orders.

THE firm of Aikin & Drummond, manufacturers of wagon axles and molding machinery, at Louisville, Ky., has been dissolved, Wm. Aikin retiring, and W. W. Drummond continuing the business.

THE Chicago *Times* says that Jay Gould has bought a hundred-thousand-dollar graveyard. Is the property to be a new feature of the stock list? If so, is it not time to set limits to speculation in fancy stocks?

THE Michigan Car Company has just completed 100 Tiffany cars for the Grand Trunk Railway, also 100 for the Great Eastern Fast Freight Line, running over the Chicago & Grand Trunk and Grand Trunk & Erie railways.

AN electrical signal apparatus on a French railway causes the blowing of a steam whistle upon a locomotive approaching a danger signal. The engineer is thus warned. This apparatus is found valuable in fogs and snow-storms, when ordinary signals often escape notice.

ON the morning of Dec. 14, a fire broke out in the depot of the New York & Manhattan Beach Railway, and completely destroyed the buildings, 10 locomotives, 13 Woodruff parlor cars, 23 ordinary passenger cars and 25 open excursion cars. Loss fully covered by insurance.

IT is said that 30 passenger cars, each 47 feet long and to be similar in their construction to those of the New York elevated roads, have been ordered for the East River Bridge. If so, it is highly probable that some of the managers of that structure will live long enough to see their mistake in building cars of that size for such a purpose.

ORDERS have been received at the Pullman Car Works, at Pullman, for 4,000 freight cars. Ten dining cars are building at these works for the Northern Pacific, and the same road has ordered 60 passenger coaches and 37 second-hand coaches. Orders are also in hand for 6 dining cars, 50 passenger, 20 mail and baggage and 6 sleepers for the New York, West Shore & Buffalo.

MR. J. D. MCILWAIN, General Foreman of the Car Department of the Great Western Division of the Grand Trunk road, at London, Ontario, has been appointed Assistant Mechanical Superintendent under Mr. Domville, Locomotive Superintendent, at Hamilton, and will have charge of the repairs and inspection of cars at outside stations, in addition to his duties at London.

THE Northwestern Manufacturing & Car Co., St. Paul, Minn., in addition to their already extensive improvements, contemplate the erection of a paint-shop 150×440, a car-erecting shop 150×400, and a car wood-shop 150×300. They are now building boiler and engine rooms 80×100, dry kiln 60×120, and paint-shop 60×520. The company are making five freight cars per day, but have a capacity of 25 per day.

THE Pardee Car Works, at Watsontown, Pa., have built a wrecking car for the New York, West Shore & Buffalo road. The car has a 10-ton jack on each side, which is used to support the car when engaged in clearing wrecks, thus saving an immense strain upon the track. There are also four sets of grips or pincers, connected by heavy chains with the platform, and so arranged that they can be attached to the rail and drawn tightly by means of screws on the platform, thus holding the car firmly in place while at work.

THE ATWOOD SAFETY NUT CO., at Springfield, Mass., are full of orders, and are supplying the New York Central & Hudson River road, for car work; the Boston & Albany and Central of Vermont, for track, cars and engines; the Albany & Rensselaer Iron & Steel Co., and Gilbert Car Manufacturing Co., at Troy, N. Y., for track; Cliff & Righter Co., at Oswego; Railways in Canada, Mexico, South America, Auckland, New Zealand, and other places, for track; have also received first order of merit gold medal from International Exhibition, New Zealand, awarded for safety nuts of superior utility.

THE Butler Excelsior Draw-Bar Attachment and Spring Protector, has been applied to 200 cars which the Ohio Falls Car Co. has just built for the Cincinnati, Hamilton & Dayton road. A test of the capacity of this attachment was made at the shops of the company, which is thus described. The draw-bar was placed on end under a drop hammer weighing 1,050 pounds. Four falls were made of 10, 15, 25 and 45 feet respectively without any perceptible effect on the draw-bar. The striking force of the last fall was estimated to be equal to a pressure of 1,500 tons.

MR. M. H. SMITH, the Master Mechanic of the St. Louis Bridge & Tunnel Co., is making some very successful experiments with a new smoke-burning invention of his own. A necessity for something of this kind exists, owing to the long tunnel connected with the bridge. To wash out his engines and detain them as little as possible, he proposed to build a large boiler from which the locomotives, after being washed out, can be filled up, not only with hot water, but with a pressure of 130 pounds of steam also. Mr. Smith has recently put in new boilers to drive the ventilating fan at the tunnel.

THE annual report of the Baltimore & Ohio road for the year ending Sept. 30 says that 29 engines were built during the year at the Mount Clare shops, in Baltimore. Of these, 19 were consolidation engines, with 20 × 24 in. cylinders and 50 in. drivers, each weighing 51 tons; 9 were for passenger service, with cylinders 19 × 24 in., drivers 69 in., and weighing 90,050 lbs.; and one for switching, with 17 × 24 cylinders, 50 in. drivers, and weighing 67,050 lbs. There were built and rebuilt at the same shops, 22 standard passenger coaches with 4-wheel trucks, 5 postal cars with 6-wheel trucks, 5 baggage, 714 gondola, 404 hopper-gondola, 228 side-dump, 208 house, 11 caboose and 21 miscellaneous cars, making a total of 1,618.

THE famous Kinzua viaduct, on the branch road of the New York, Lake Erie & Western, near Alton, McKean County, Pa., is said to be the highest structure of its kind in the world. It is 2,052 feet in length, and is supported by 20 towers, each composed of four wrought-iron columns, with the requisite bracing. The roadway is laid on latticed girders of 61 feet span, and the cross-ties are 8 inches apart. On each side of the rails are heavy, square timbers laid parallel with the track, which would hold an engine from going over into the abyss if it were to jump the track. A passage-way on either side, laid with yellow pine and secured by a railing four feet high, enables pedestrians to pass over leisurely and view the scene from this great elevation. The bridge in the center is 302 feet in height. About 4,000,000 pounds of iron were used in its construction, and the entire cost of the structure was nearly $300,000.

AN exchange prints the following memoradum sent to it by a gentleman in Wall street; "The chief difficulty in the way of introducing upon our railroads the most recent improvements in signals, switches, etc., is the fact that patents for old and defective appliances are owned in whole or in part by either the president, superintendent or other officer of railroad companies. When a new and palpably good and potent thing for the protection of life upon railroads is offered to the president, he refers the subject to the superintendent, who sends an assistant to make an examination of the new invention, and ten to one it will be condemned, not on its merits, but because one of these officers is interested in a less efficient contrivance already in use. I know the master mechinist of one of our great railroads, who was himself an inventor, and amassed a fortune by placing his own inventions on the roads and keeping off all others, however meritorious."

THE increasing traffic of many railroads during the past few years has led the managers to investigate the various devices for signaling, in order to facilitate the movement of traffic with greater safety, and experiments have at the same time been made with electric signals in which the current was carried on wire circuits and controlled by track instruments. These have proved unreliable, and are being discarded, to give place to the rail circuit system, by the Pennsylvania, Boston & Albany, Old Colony, Fitchburg, Providence & Worcester and other roads.

THE following incident is a fair illustration of the reliability of "color-blind" experts, and is also suggestive that precautions in this respect may sometimes be carried to an excess that is not creditable to the general management of roads nor just to employés. A locomotive engineer on a certain prominent road, upon which color-blind regulations had been some time in force, was formally examined by the official ophthalmologist and pronounced incapable in consequence of defective vision. The engineer was, of course, discharged from service. Not long afterwards he rigged himself up as a rustic farm laborer and presented himself at the city office of the expert, saying that something was the matter with his eyes and requesting to be examined. The oculist, of course, did not recognize him, and after a careful examination gave him a certificate that his vision and capacity of discriminating colors were perfectly normal. The engineer, it is now said, stands a fair chance of being reinstated

A CORRESPONDENT of the Atlanta (Ga.) *Constitution* says

In a talk with Mr. John B. Peck, of the South Carolina road, I asked him if he thought the next ten years' development would increase the speed of railway trains:

"Unquestionably," he replied. "I should not be surprised to see trains run at 100 miles an hour. This would carry a train from Atlanta to New York in less than 10 hours. It is simply a question of straight, double track, heavier rail, firmer ballast and larger driving wheels on locomotives. Already there are engines that have run at the rate of 78 miles an hour. On the South Carolina road, during summer, we have a daily train that is run 10 miles in 10 minutes, and the passengers don't know it."

"A few years ago you would have considered a mile a minute an impossible rate of speed."

"It was impossible. The simple invention of the air-brake increased the schedule rate of trains fully 100 per cent. It made the stops shorter and made a high rate of speed safer. The introduction of hotel cars saves much time, as it eliminates stops for meals. So the putting of water troughs in the centre of the track and postal cranes at the side of the track. The substitution of electricity for steam will be another step forward. In these fast days time is worth everything. I think you may hope to see the day when you can eat breakfast in Atlanta and supper in New York without any inconvenience from fast travel.

Early American Locomotives and Railroads.

The first Railroad built in America appears to have been at Quincy, Mass., in 1826. It was three miles long. In 1827 another was built for the use of the coal mines at Mauch Chunk, Pa. It was nine miles long and was operated by mules. In 1828, the Baltimore & Ohio, South Carolina, and the Delaware & Hudson Canal Companies, each built a road, all of which were operated by horse-power. In 1812, Col. Stevens proposed to the legislature

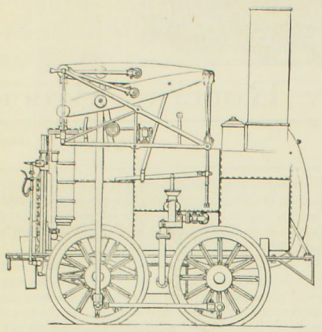


Fig. 1.

of New York to build a road and operate it with locomotives, but nothing came of it. Horatio Allen was appointed by the Delaware & Hudson Canal Company to purchase three locomotives in Europe. The "Stourbridge Lion" was the first of the three that arrived, and it was the first locomotive brought to America. This engine is shown in Fig. 1. On the 8th of August, 1829, it was tried on the road at Honesdale, Pa. Its boiler was 16½ feet long, and the two cylinders were 3 feet stroke. Mr. Allen, on the date mentioned, started the engine, running it around a curve and up the road about two miles and then returned to the place of starting. This experiment demonstrated that the track was not sufficiently substantial for so heavy an engine, its weight being 7 tons. It was

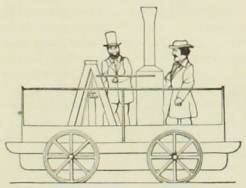


Fig. 2.

housed beside the track, where it remained for fifteen years, when the boiler was removed to Carbondale and used for stationary purposes and the remainder sold for old iron. Thus the first locomotive was a failure. In September, 1829, one of Geo. Stephenson's engines arrived in New York, and was jacked up clear of the rails and run. The following is Mr. Allen's account of his trip on the "Stourbridge Lion."

"The circumstances which led to my being left alone on the engine were these: The road had been built in the summer, the structure was of hemlock timber, and the rails of large dimensions notched on caps placed far apart.

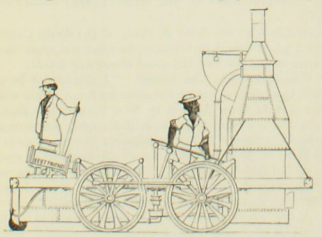


Fig. 3.

The timber had cracked and warped from exposure to the sun. After about 500 feet of straight line, the road crossed the Lackawaxen Creek on a trestle-work about 30 feet high and with a curve of 350 feet radius. The impression was very general that the iron monster would either break down the road, or that it would leave the track at the curve and plunge into the creek. My reply to such apprehensions was, that it was too late to consider the probabilities of such occurrences; that there was no other course but to have the trial made of the strange animal which had been brought here at such great expense, but that it was not necessary that more than one should be involved in its fate, that I could take the first ride alone, and that the time would come when I should look back to this incident with great interest. As I placed my hand on the throttle I was undecided whether I should move slowly or with a fair degree of speed, but believing that the road would prove safe, and prefering if we did go down to do so handsomely and without any evidence of timidity. I started with considerable velocity, passed the curve over the creek safely, and was soon out of hearing of the cheers of the large assemblage present. At the end of two or three miles I reversed the valve and returned without accident to the place of starting, having thus made the first railroad trip by locomotive on the Western Hemisphere."

The Baltimore & Ohio road had been built to be operated by horses, and to save expense in cuttings, curves were introduced. The English engines were thus illy adapted, with their rigid and long wheel bases, for short curves. Peter Cooper at this period owned some land, the enhanced value of which depended on the successful operation of the Baltimore & Ohio road, and to demonstrate that a locomotive could be built which would run on the short curves of that road, Mr. Cooper, in 1829, built the "Tom Thumb," shown in Fig. 2. This engine had an upright boiler 20 inches diameter by 5 feet high, fitted with gun barrels for flues. It had a single cylinder 3¼ × 14½ inches.

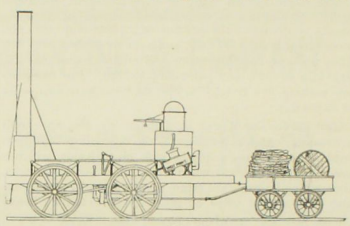


Fig. 4.

The engine drove a large gear which meshed into another smaller gear on the axle. The fire was urged by a fan driven by a belt. The driving-wheels were 2½ feet in diameter. On the 28th of August, 1830, the first railroad car in America propelled by a locomotive was tested on the Baltimore & Ohio road. The wheels were "coned," and this was the first use of this principle as applied to car wheels, and was suggested by Mr. Knight, chief engineer of the road.

This engine (Cooper's) was coupled to a car in front of it containing a load of 4½ tons, including 24 passengers. The trip of thirteen miles was made in one hour and fifteen minutes, the best time for a single mile being 3½ minutes. The return trip of thirteen miles was made in 57 minutes. While this engine of Mr. Cooper's was built for experiment solely, it was the first locomotive built in America.

In 1830, the South Carolina road had constructed at the West Point Foundry, in N. Y., an engine called the "Best Friend," which was the first engine built in America for actual service. It is shown in Fig. 3. The cylinders were 6×16 inches; drivers, 4½ feet; weight, 4½ tons. Nichols W. Darrell run this engine on the South Carolina road for

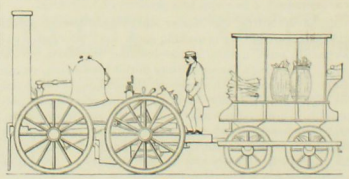


Fig. 5.

some time, and remained in this company's service as engineer until near his death in 1869. He appears to have been the first regular locomotive engineer in America. In 1831 the "West Point," built at West Point Foundry, was started on the same road. This engine is shown in Fig. 4, and had same size cylinder and wheels as the "Best Friend." The boiler was horizontal, with 2¼-inch flues, 6 feet long. With five cars containing 117 passengers, this engine made 2¼ miles in eight minutes.

In 1831 the West Point Foundry built a third locomotive called the "De Witt Clinton," for the Mohawk & Hudson Railroad, of N. Y. It is shown in Fig. 5. In 1831, John B. Jervis, Chief Engineer of the Mohawk & Hudson road, designed an engine with the truck under the cylinders. This engine was built at the West Point Foundry, but was the first engine in the world on which a truck, or "bogie," was used. Mr. Jervis sent drawings of this device to England, from which Stevenson built the "Davy Crockett" for the Saratoga Railroad Co.

Mathew Baldwin, a jeweler and silversmith, of Philadelphia, built in 1831, a miniature locomotive for the Philadelphia Museum. In 1832, he built for the Philadelphia, Germantown & Norristown road, an engine called "Old Ironsides" shown in Fig. 6. Its weight was 5 tons, driving wheels 54 inches in diameter, cylinders 9½ × 18 inches. Wood was used for spokes and rim of the wheels, as well as for the frame of the engine. In 1834, Mr. Baldwin patented the half crank, shown in Fig. 7, which was in use for some time afterwards. It was a much cheaper crank than the ordinary form. Mr. Baldwin's second engine was built in 1834, for the Charleston & Hamburg road. The drivers were cast from bell metal. As they soon wore out, nothing further in this line of wheel was attempted. The cylinders were 10 x 16 inches. This engine is shown in Fig. 8. This form of engine was in use for several years. The drivers and axle are shown in Fig. 9. To Mr. Baldwin is due the "ground joint" so universally used now, and which originated with him at this period. In Fig. 10 is shown Mr. Baldwin's combination of pump barrel and guide-bar. In 1834, Mr.

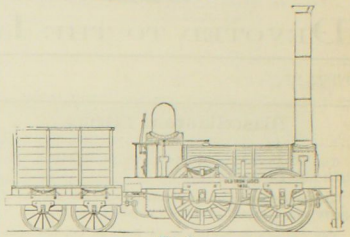


Fig. 6.

E. L. Miller patented a method of throwing part of the tender's weight on the engine, and in 1839, Mr. Baldwin bought this patent for $9,000. In 1835, he patented the driving-wheel shown in Figs. 11 and 12. In the same year he also patented the use of a copper ferrule on the outside of the end of the flue to form a joint with the flue sheet. This form of joint is extensively used at the present day. In 1846, and afterwards, Mr. Baldwin built a large number of 8-wheel connected engines, shown in Fig. 13. They became very popular on account of their great hauling capacity and the ease which they run round curves, this latter being due to the flexible truck. In 1837, Thomas Rogers built the engine shown in Fig. 14, and in Fig. 15 is shown his driving wheels and axle. In 1838, Mr. Rogers built the engine shown in Fig. 16. In 1842, Mr. Baldwin's engines had assumed the form shown

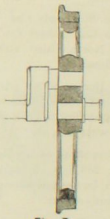


Fig. 7.

in Fig. 17. In Fig. 18 is shown his patent flexible beam truck, which allowed the forward drivers to be formed into a truck to accommodate themselves to curves, and also of being connected by a side rod to the back drivers. This engine became very popular. In 1844, Rogers engine is shown in Fig. 19, and in 1845 he built the engine shown in Fig. 20. Fig. 21 shows the valve gear used by Rogers in 1845 and 1846. In 1847, his gear had assumed the form of Fig. 22. In 1848, Mr. Rogers built the ten-wheel engine shown in Fig. 23. In 1850, he built the engine shown in Fig. 24, which was fitted with the shifting link motion, and in 1854 Mr. Rogers used the valve gear shown in Fig. 25. To him is also due the credit of first using the expansion plate.

In 1857, Mr. Baldwin built the rack rail engine, shown

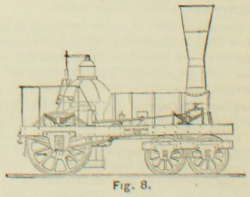


Fig. 8.

in Fig. 26, for operating an inclined plane. On a level track the ordinary cylinders were used, while on the incline the upright cylinder drove the gear meshing into the rack between the rails, thus assisting the engine very materially. In 1848, Baldwin built the fast passenger engine shown in Fig. 27, for the Vermont Central road. The contract was for a speed of 60 miles per hour with train. The drivers were 6½ feet diameter, cylinders 17½ by 20 inches. It is stated that this engine could be started from a state of rest and run a mile in 43 seconds. In 1853 Baldwin used the valve gear shown in Fig. 28.

FRANK C. SMITH.

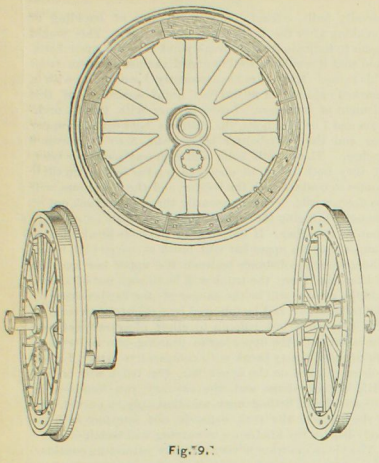


Fig. 9.

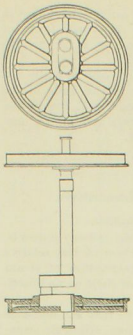


Fig. 15.

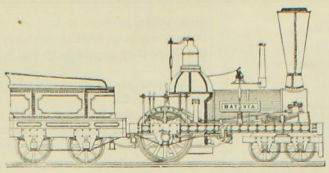


Fig. 16.

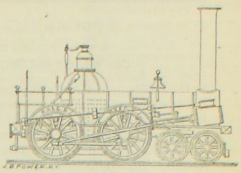


Fig. 20.

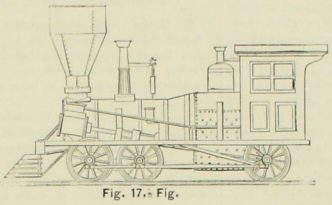


Fig. 17.

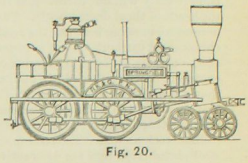
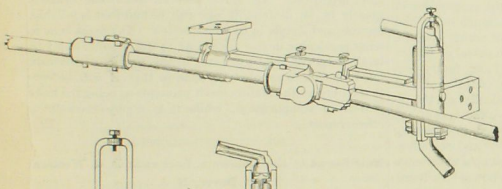


Fig. 20.



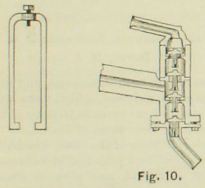


Fig. 10.

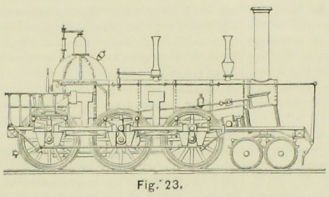


Fig. 23.

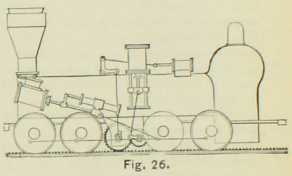


Fig. 26.

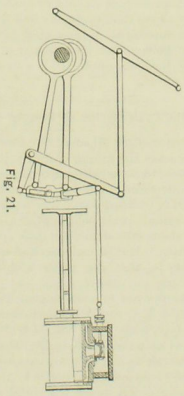


Fig. 21.

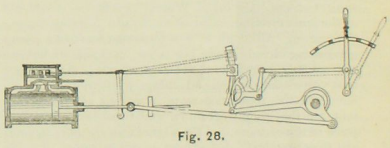


Fig. 28.

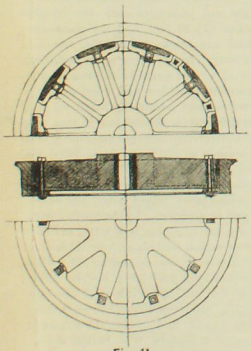


Fig. 11.

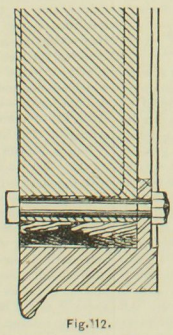


Fig. 12.

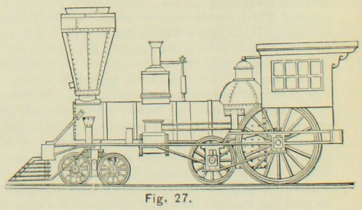


Fig. 27.

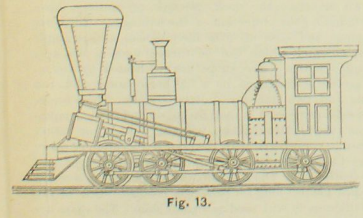


Fig. 13.

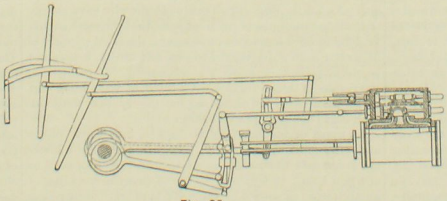


Fig. 25.

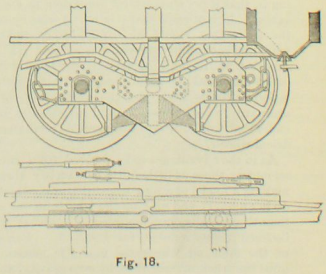


Fig. 18.

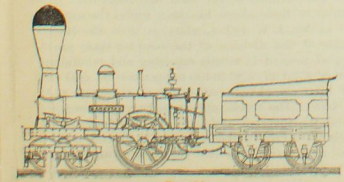


Fig. 14.

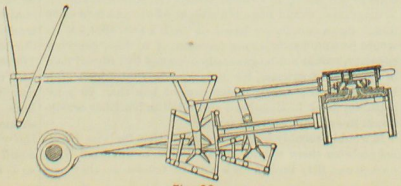


Fig. 22.

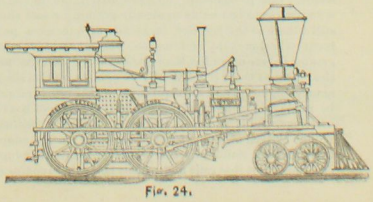


Fig. 24.

Communications.

Car Wheels and Rail Sections.

To the Editor of the National Car-Builder:

It is announced that the subject for discussion at the January meeting of the Car-Builders' Club, will be "Wheel Flanges and Rail Sections, and Gauges for each," and that civil engineers and road-masters will be invited to be present. This is a move in the right direction. Years ago, the writer urged the importance of a more liberal interchange of ideas between those in charge of the road and rolling stock departments. Both permanent way and rolling stock are subject to many abuses for which there is no remedy without earnest and frequent discussions by the heads of these departments. The degree of harmony heretofore existing between the roadmen and master mechanics and car-builders has not been for the best interests of the owners or for either branch of the service. Civil engineers design rail-sections, and, no matter how faulty, they are adopted as standards for their respective roads. The form of the rails may be such as to not only go to rapid destruction themselves, but they are destructive to rolling stock as well. The road-masters will use cast-iron, steel-plated frogs that are destructive to wheels, and hundreds of them are broken by badly-formed and improperly-placed guard-rails. Master mechanics and car-builders may offer a remonstrance to all this mal-construction, but it is of no avail, and they are very likely to be informed that it is none of their business, and this creates an unpleasantness. On the other hand, the roadmen complain that the mechanics persist in running flanges that are worn so sharp that they mount rails and get on the wrong side of the frog-points, and thus destroy the track with their pet Moguls, Consolidations and other monstrosities in the shape of many coupled driving wheels with the inevitable long wheel bases. Remonstrance is of as little avail here as on the other side of the house. But the present indications are, that in the future the roadmen and mechanics will be on "visiting terms," which is equivalent to a consolidation of the interests of the departments they represent.

It would not be out of place, as it seems to me, if the subject of the "Coning of Wheels" could be considered at the same meeting, or at some future meeting during the season. Although it is a topic that has had a pretty good airing already, there are some mechanics who can not see any benefit in the cone of wheels. They admit that "there *may be* some advantage while the wheels are new, and the tread not worn down to any great extent, but they soon wear down and there is a groove in place of the cone, so that the advantages are more theoretical than practical. It has been shown, however, that the rapid wear of wheel treads, by which the cone is destroyed, is due to the improper form of rails, and their being improperly placed in the track. Steel-plated frogs and the slipping of driving wheels also hasten the destruction of the cone. If the rails are made flat on the top in cross-sections, that is, the top parallel with the base, and they are laid with their vertical center line perpendicular, a coned wheel will have no bearing, except on a very narrow portion of the inner edges of the rails. In this case, both wheels and rails are rapidly destroyed; but if the rails are laid with their bases inclining inward to a proper degree, the treads will have a bearing the entire width of the surface of the rails. In this way the wear of the rails will be reduced to a minimum, and the treads of wheels will wear evenly and the coning be preserved. Moreover, by inclining the rails inward, it changes the angle of resistance in their favor, increases their stability, and in a great measure prevents the spreading of track, which is a frequent cause of disaster. Another advantage arising from the coning is, that it prevents lateral oscillation to a considerable extent. It is obvious that if a wheel were cylindrical, all the force that would be required to produce oscillation would be enough to overcome the natural friction of the wheel with its lead on the rail, whereas, if the wheel is coned an additional force is required sufficient to raise the wheel with its lead just the amount of cone, so that, ordinarily, a coned wheel would run steadily under influences that would cause a disagreeable oscillation on cylindrical wheels.

As to the advantages to be derived from coned wheels on curves, those of little faith can satisfy themselves by making a model of a four-wheeled truck (which they can do in an hour), and making the wheels on one side smaller than the opposite ones, and placing the truck on a smooth, inclined plane, a table, for instance. Raise the end of the table, on which the model is placed, gradually, until the truck moves off by its own gravity, and note the result. But it somehow happens that those mechanics who profess to be unable to see any good in a coned wheel, still adhere to the practice, and many of our most prominent wheel-makers and master mechanics advocate a greater degree of coning than has formerly been the practice. But as there is a diversity of opinion on this subject among engineers and mechanics, it might very properly be made the subject of discussion at some of the club meetings, and it is hoped that some definite conclusion will be arrived at, and a form of rails and wheels adopted as a universal standard. But whatever forms are adopted it is important that rails and wheels be made to conform to each other, so that it will not cost millions of dollars in the aggregate to wear them down to the proper form, or the shape they should have had when new, as is now the case.

The question of flanges and gauges can be easily disposed of, but the rail sections, the position of rails in the track, and the form of wheel treads, will require the united efforts of engineers, road-masters and master mechanics to reach a satisfactory result.

WM. S. HUNTINGTON.

Consumption of Water by Locomotives.

To the Editor of the National Car-Builder:

A writer says, in one of the leading railway journals, "that for the purpose of a comparison of the relative economy of two locomotives, the consumption of steam or water per horse-power per hour is of little or no practical value."

It must be evident that the writer of this statement is not what may be called a practical man, although seemingly well up in theory. If, as the writer asserts, "stockholders are interested in how much coal one engine will burn," it follows that they are, or ought to be, no less interested in the quantity of water used. The supplying of water is a large item in railway expenditure, and the repairing, cleaning and building of new boilers is another large item. If one class of engines on a large road use 20 per cent. more water than another class, the cost of the additional supply is considerable, while the evaporation of this much extra water taxes the boiler much more, and deposits a larger quantity of scale, all of which means a more frequent pulling out of flues and renewal of boilers by building new ones. A boiler may, from faulty construction, consume a comparatively large quantity of coal while the engine is using steam economically, or the reverse may be the case. Surely the stockholders of the road, as well as the managers, are interested in knowing whether the fault is in the engine or boiler, and the efficiency of the engine can only be ascertained by a knowledge of the quantity of water used per horse-power per hour. If the writer of the statement above quoted were in a position of authority in the mechanical department of any road with an average amount of traffic, he would become painfully aware that managers and stockholders are just as much interested in the cost of new flues, new boilers, repairs of boilers, and the quantity of water used, as they are in the fuel consumed. It is a matter of dollars and cents all round.

HARRY REVERE.

The Construction of Freight Car Trucks.

To the Editor of the National Car-Builder:

The report of the testing of iron trucks in your November number, together with the accompanying illustrations, is very interesting, and has no doubt been studied by thousands of railroad men. The weak points that are indicated cannot well be disputed; but it is a question whether the results should be fully accepted as a guide in construction. The logical conclusion arrived at by the committee is, that the upper arch-bar should be the heaviest, but the contrary has been practically demonstrated in the use of cars in general service on our railroads. Of a large number of arch-bars that have failed in such service, more than half have been the lower ones. This is owing to the fact that the tensile strain, transmitted irregularly as it is by a moving train, is more destructive to the elements of strength in wrought iron than is compressive strain under the same circumstances. All the trucks with which the tests were made were probably new ones or nearly new, some of them having been built expressly for the purpose. They had not been in general service under heavy loads on an ordinary track. If they had been, and had they been loaded to a point at which they would have broken in trains moving at ordinary speed, the results would in my judgment have been different. As it is the desire of all railroad men who have charge of the construction and repair of cars, that the work should be done in such a manner as to render the greatest amount of service with a due regard to cost and safety, it may not be out of place to suggest the advisability of comparing the results of actual service with those of shop tests, and make haste slowly in accepting the theory that the weak arch-bars should be placed below.

An upper or top bar may be broken into three pieces and still render service if the bolts are good, but a lower bar is not safe to run if it is slightly cracked at a bend or at a bolt hole. It will also be found that the buckling of an arch iron, as shown in the tests, is of rare occurrence. A shop test would probably have indicated that ⅞ in. arch bolts in the Michigan Central trucks (Numbers 13 and 14, in diagrams), would sustain a weight of car and load of 90 tons. But a conclusion based on such a test, that ⅞ bolts would be sufficiently strong for cars of 20 tons' carrying capacity, would not be generally accepted by railroad men of practical experience, for it is known that 1 inch arch bolts frequently break under cars of less than 20 tons' capacity, after having been subjected to irregular tensile strain in ordinary railroad service.

It would probably be safe to assume that for one buckled arch-bar there would be ten lower or inverted ones broken and fifty broken arch bolts in trucks as they are usually built, except, of course, cases of buckling or breaking after the bolts have given way. This would seem to indicate that the weak point is in the arch bolt, and that it would be well to guard against dangers from this cause. Many cars have recently been built with a marked capacity of 40,000 lbs., quite regardless of the element of weakness. I refer to cars with 1x3 in. arch bars and ⅞ or 1-in. bolts, the distance between the upper bar and the body-bolster being from 5 to 7 or even 8 inches. These arch bolts will give way sooner or later. If they both break at once the top bar will go up till it comes in contact with the bolster, and the lower one will go downwards. This necessarily throws the truck out of shape by bringing the wheels nearer together on one side than on the other. If only one of the bolts break there is danger that the upper bar will break at one or both holes. The greater the distance between the upper bar and the bolster, the more the truck will be thrown out of shape, and the greater will be the danger of the bar breaking by the fall and jar, and be followed by a disastrous wreck. If this distance is just enough to allow clearance between the bolster and the upper bar in running, one or both of the arch bolts may break with comparative safety, for the bolster will rest on the upper bar, the truck will be but little out of shape and the car may run hundreds of miles with but little danger, and that only on curves, and if the heads of the arch bolts do not interfere with the body-bolster the hindrance to curving will be but slight.

The brake question is very properly attracting considerable attention. All agree that an automatic brake is greatly to be desired, if one can be had that is reliable, durable and simple in its construction. Any opinion as to what particular device answering to this need is likely to be the brake of the future may at this time be premature, but I venture to express the opinion that it will be one that embodies the Mallinckrodt principle as being the most free from complication, while it is unobjectionable in other respects.

I

New Shops of the Delaware, Lackawanna & Western at Dover, N. J.

These shops have just been completed, and are a great improvement upon the old ones, which were quite inadequate for the amount of car work to be done at this point. Their location is near the village of Dover, on the line of the Morris & Essex division of the road. The buildings are of brick, and consist of two principal structures of ample dimensions, well ventilated, and with an abundance of light. One of these is used for the construction and repairing of both freight and passenger cars, the freight shop occupying a space of 71×93 feet, and the passenger shop 93×179 feet. There are tracks for running the cars in and out in the usual way. In the other main building, which adjoins and runs at a right angle in the rear of the first one, are the blacksmith, machine and wood-working shops, all of them spacious and admirably fitted up and arranged. The blacksmith shop is 60×90 feet in size, and has 12 forges, a steam blast-blower, trip hammer and punch and shears. The machine shop is 60×70 feet, and is fitted up with the most improved machinery, including a combined planer, shaper and slotter, lathes, drill press, bolt cutter, nut tapper, hydraulic wheel press, wheel borer, and other machines that are not yet in position. In the lumber room or wood-cutting shop, the size of which is 60×130, are a mammoth planers, one of which will plane four sides of stick at once, and of any size not exceeding 12 inches square; the other is 110 feet long, and has a 50-foot bed. There is also a machine for cutting moldings of any pattern, also planing, tenoning, grooving, and other machinery indispensible in this department, and bearing the names of C. B. Rogers & Co., Goodell & Waters, Wm. Sellers & Co., McIvor Bros., and other manufacturers.

The former shops having been nearly destroyed by fire on two occasions, the most effective precautions have been taken for the protection of the new ones. There are fire plugs and hose all over the premises, and an ample supply of water which can be turned upon a fire at a moment's notice. The shops are all heated by steam. The power is furnished by a 120 horse-power Mel engine and two immense tubular boilers. These shops, when fully completed in their fitting up and in the adaptation of their surroundings, will be models, or rather palaces, in comparison with the cramped location of the others that might be named, with their dim lights and poor ventilation. The company contemplates the erection of a shed 400 feet long for passenger coaches. One of the old buildings is still used as a paint shop. The shops are used exclusively for car work and employ at present about 150 men, although a much larger force can be employed whenever the business of the road may require it. The construction of these shops has been under the superintendence of Mr. J. W. Baker, who has been the Master Car-Builder of this division of the road for many years. The work at present is mostly repairing and rebuilding. The first of a lot of new 20-ton hopper-bottom coal cars has just been completed. About 30 of them are to be built at once. The trucks appear to be very strong and substantial, the inverted arch-bars extending out beyond the wheels and a cross timber bolted to their end, making a stiff and rigid frame, to which the brakes can be applied so as to be outside the wheels.

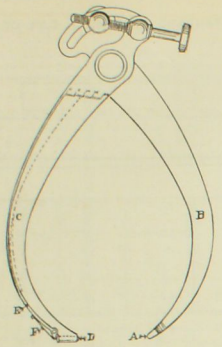


Fig. 1.

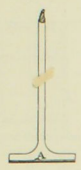


Fig. 2.

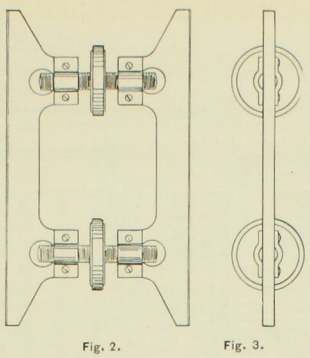


Fig. 3.

BARTLETT'S DIFFERENTIAL CALIPERS.

The importance of tools for securing accurate measurements in machine work is recognized by all intelligent mechanics. The "cut and try" method can never lead to satisfactory results, either in the construction or operation of machinery, to say nothing of the larger expenditure of time and labor that is necessarily involved in the use of crude and imperfect methods.

The engravings illustrate an improved tool of this description, designed by Mr. Le Roy Bartlett, the Assistant Master Mechanic of the St. Louis shops of the Missouri Pacific Railway. It is called differential calipers, for the reason that it is designed to measure differences with a greater degree of accuracy than is possible with the means usually employed in railway machine shops.

The calipers, Fig. 1, are formed of two arms or limbs in the usual way, with a foot A on the lower end of limb B, which is perpendicular to the leg and parallel with the axis of rivet in joint, so that the calipers, when opened to any size and put upon the work, will always be perpendicular to the axis of the piece measured. The other leg C, has a small pin D, on the lower end, sliding freely in its guide and perpendicular, or nearly so, to the surface of the work against which presses the short arm of the index pointer E, which is held firmly against the pin by a small spring F. The long arm of the pointer passes along the leg of the calipers until it reaches the index, as shown. The upper end, or that part above the rivet, is so arranged as to give a slow movement with tangent screw. These are the principal features of the outside calipers. The inside one is composed of two plates of steel shaped as in Figs. 2 and 3, and operated by two right and left screws.

The edge of this tool is ground true to a 4-inch circle, and in using it in a larger hole than 4 inches, it will give the bearing along the center of its edge. As it is intended for locomotive work, filling crank-pins, etc., the method of using it may be described.

The person doing the work places the inside calipers in the hub of wheel, or crank, opens it with the screw until it fits tightly against the wall of hole, but not so tight that it cannot be pulled out easily. When taken out, the calipers will indicate the size of hole. A pin is now wanted that, when driven in, will press tightly into the hole thus measured, assuming at the same time, that in order to have the pin tight enough for the work it must perform, it must be .007" larger than the inside calipers, the calipers representing the pin as just filling the hole without driving. In order to ascertain the amount of difference assumed for the fit, the outside calipers are opened so as just to pass over the inside calipers, just as an ordinary one would be used on a mandrel of that size. He now, by moving tangent screw, brings the points of outside calipers together until the index pointer indicates two, four or five, or, say three, divisions on index, when calliper is pushed back and forth over inside calipers. The size of inside calipers, for example, is x (no matter what it may be in inches) and of outside calipers y .003 on index, and their amount of course is x, the size of hole in hub of wheel. Assuming that in order to have the pin tight enough, it must be .007" larger than x, the workman turns the pin until the calipers, when pushed over the work, indicate $y + .003 + .007 = y + .010$. When this point is reached he feels that the work can be relied upon.

The instrument will give taper fits with equal accuracy by simply measuring each end of the piece and noting the difference, and then by adding the proper amount to each reading the exact taper is found.

Mr. Bartlett is also the inventor of a 3-cylinder air engine for driving portable drill, a valve-facing machine and other special tools used in his shops at St. Louis, some of which will be described in these columns in due time. These shops are lighted with electric lamps of his design and construction, a branch of scientific inquiry in which he has met with considerable success.

REFERRING to the mathematical problem on page 137 of our December issue, a correspondent says: "The length of the two trains being 290 yards, the rear ends are that distance apart when the engines meet; and as the 150-yard train moves at the rate of 50 miles an hour, it will take 11.86 seconds for it to run the 290 yards; and the other train moving at 40 miles an hour in the opposite direction, will require 14.83 seconds to run the same distance. The time between the meeting and parting of the trains will therefore be equal to one-half the arithmetical medium of the two results, or $\frac{11.86 + 14.83}{4} = 6.67$ seconds, the time occupied in passing one another. This, I think, is the correct solution."

American Railway Cars from an English Point of View.

Mr. Richard A. Proctor, the English astronomer, who has traveled much in this country, enumerates the following advantages of our passenger train system, each count being apparently set off against a corresponding disadvantage in the English system:

1. You can get on board an American train or leave it when the train is moving pretty fast in perfect safety. I have run after a train and got in the rear car (with a helping hand from a brakeman) when it had attained a rate of certainly twelve miles an hour. I have never left one traveling at that rate, but by the rear car it could be done safely enough—at no worse expense than a sprawl.

2. When on board you can choose any car or any part of any car to sit in; you can go to the smoking car if you want to; or, if you like, you can visit the baggage van to see that your luggage is safe—all when the train is at full speed. I have walked the whole length of a train with both hands occupied by satchels, etc., stopping only when opening and shutting the car doors.

3. If pressed for time, you can, in nearly all parts of America, go on board without a ticket, and obtain one at the first visit of the conductor.

4. Tickets are attended to while the train is traveling. There is no absurd stoppage at the last station but one and proclamation of "All tickets ready!" but, without delay of any sort, all tickets are collected *en route*.

5. The travelers by the train form a single community, with a force of conductors, brakemen, porters and luggage men, so that if a disorderly or drunken person gets on board he must behave himself, at the risk of being turned off the train (in bad cases while the train is moving pretty fast, so that his exit is hasty and undignified, yet not unpleasing to those he had thought to annoy).

6. You generally travel in much more real privacy and comfort than in an English first-class carriage, not secured by a lawless foe to the guard. I used to find quite a rest in a railway journey between my lectures in America, with a little two-seat compartment to myself, all the passengers sitting in similar compartments facing one way; I could read or reflect undisturbed. Who can say quite so much of an English first-class carriage, if there are two or three passengers on the opposite seats? It is true that part of this arises from the "stony British stare," which foreigners and Americans find so strange and so unpleasant. But "fix it how you will," you can never feel quite as much at ease facing several persons as when all face the same way. On one very special occasion in America, when I had to travel in an ordinary car for several hours under circumstances which would have made staring excusable enough (not to make a mystery where there need be none, I was one of a wedding party of two), I was struck by the careful courtesy with which a two-seat compartment seemed to be regarded as if it were a private sitting room. I never more thoroughly recognized the innate courtesy of all Americans toward ladies than I did on that occasion. Of course, when traveling in an American car a man may be addressed by a fellow passenger more freely, than in England. But it is easy to answer pleasantly; and if the conversation wearies, either to close it or seek another place.

7. All the carriages are well warmed, and warmed quite safely. I speak without any prejudice in favor of car stoves; for in a railway accident in Missouri I made a much more intimate acquaintance with one than I cared for, and shall carry the marks of the encounter to the grave. But one cannot expect stoves to behave well when the car they are intended to warm is pitched over an embankment thirty feet high. Under all the usual conditions of travel they are perfectly safe traveling companions, and many a time and oft I have missed them when shivering in an English first-class carriage despite wraps and the abomination known as a foot-warmer.

8. In all cars there is a retiring room; in nearly all there is a supply of drinking water; and in many there are conveniences for washing, brushing, etc.

If American trains only consumed their own smoke, they would be perfection; as it is, there is a very serious draw-back to American railway traveling in hot weather. To reach your journey's end with collar, cuffs, and shirt front, which had been clean a few hours earlier, reduced to smoke-stained, cinder-dust strewn clouts, is not a pleasant experience. The fault is one which might be easily corrected.

THE Supervisory Committee have decided that the next annual convention of the Master Mechanics' Association shall be held in Chicago on the third Tuesday in June (19th), 1883. President Wells has appointed the following Committee of Arrangements: E. T. Jeffrey, Illinois Central; Jacob Johann, Wabash, St. Louis & Pacific; James M. Boon, Chicago & Northwestern.

National Exposition of Railway Appliances.

The following circular is dated from the office of the commissioners, at the Grand Pacific Hotel, Chicago, Dec. 4, 1882:

Almost a year ago, the feasibility of organizing and conducting a National Exposition of Railway Appliances at some favorable point in the United States and in the near future began to be discussed by prominent parties deeply interested in the growth and prosperity of this interest. A very thorough expression of the sentiment of railway men and inventors and manufacturers of and dealers in railway appliances has during this period been obtained, the universal tone of which has been enthusiastically in favor of the proposition.

Accepting this as a safe indication that an exposition can be organized which will reflect credit upon the result in great good to the railway and manufacturing interests of this country and of the world, and believing that the magnitude of these interests and their wonderful growth in the past few years make the present a most auspicious time in which to accompish this, a board of commissioners, whose names are attached to this circular, has been organized to arrange for and conduct such an exposition.

The Inter State Exposition building, located near the business center of the city of Chicago, on the shore of Lake Michigan, and convenient to the depots of the various railways, have been secured. These are the largest exposition buildings in this country, and are especially adapted to the purpose in question. The main building is 800 ft. long and 200 wide, has a capacious gallery one-third of a mile in length, and is provided with an abundance of steam power for operating machinery. Railway tracks will be laid the entire length of this building for the accommodation of cars and locomotives and for use in making tests, which will be connected with the tracks of the Baltimore & Ohio, Illinois Central and Michigan Central roads, running within a few feet of its eastern wall.

Most favorable rates will be given by the railways of the country for the transportation of articles intended for exhibition and excursion parties desiring to attend.

A series of scientific and practical tests, to be made by well known scientists and carefully selected committees, extending to every article and every description of material susceptible of reliable test, will constitute one of the most interesting as well as most valuable features of the exposition. An official record of these tests and of every exhibit, including a list of prizes awarded will be made and published under direction of the commissioners.

Exhibitors will be required to pay a reasonable fee for themselves and for employés in charge of exhibits, and an extra sum for each class in which they may desire to compete for a prize (the amounts to be hereafter fixed), to defray the expenses of conducting tests and examinations and of providing medals.

Every dollar of the proceeds of the exposition, after defraying necessary expenses, will be devoted to benevolent purposes connected with the railway service, to be hereafter designated by the commissioners.

A large guarantee fund has been raised in Chicago, sufficient to insure beyond peradventure the financial stability of the exposition.

No officer or commissioner will receive any salary or compensation for his services as such, the good of the great interests named and of the army of employés connected with them being the only incentive to the labor which he shall perform.

The exposition will open on or about Thursday, May 31, and close on or about July 7, 1883, and the time for preparation being thus limited, it is important that all who intend making exhibits shall begin necessary preparations at once.

It is requested that each person or firm receiving this circular (No. 1) will, at the earliest possible moment, indicate, as nearly as may be, his or their intentions with reference to being represented at this Exposition, the probable extent and character of the exhibit, the least amount of space that could be used to properly present it, and the greatest amount that could be advantageously used provided it could be had. As soon as these replies have been received, a diagram of the Exposition buildings, showing amount and character of space to be assigned will be sent to all parties desiring to exhibit, together with necessary blanks on which to make application.

An admission fee will be charged visitors, thus relieving exhibitors of the necessity of providing for the expenses of the Exposition.

It is believed that an exhibit can be organized which, in its benefits to the more intelligent masses, and especially to officers and employés in the railway service, and all who are interested in the manufacture of railway appliances, and as a contribution to the world's store of technical and practical knowledge, has never been equaled.

To this end it is earnestly hoped that every one who is directly or indirectly interested in supplying railroads, either with material or manufactured articles, will interest himself in this matter, and that every deserving article properly coming under the head of railway appliances may be creditably represented at this Exposition.

All correspondence should be addressed to the Secretary.

COMMISSIONERS.

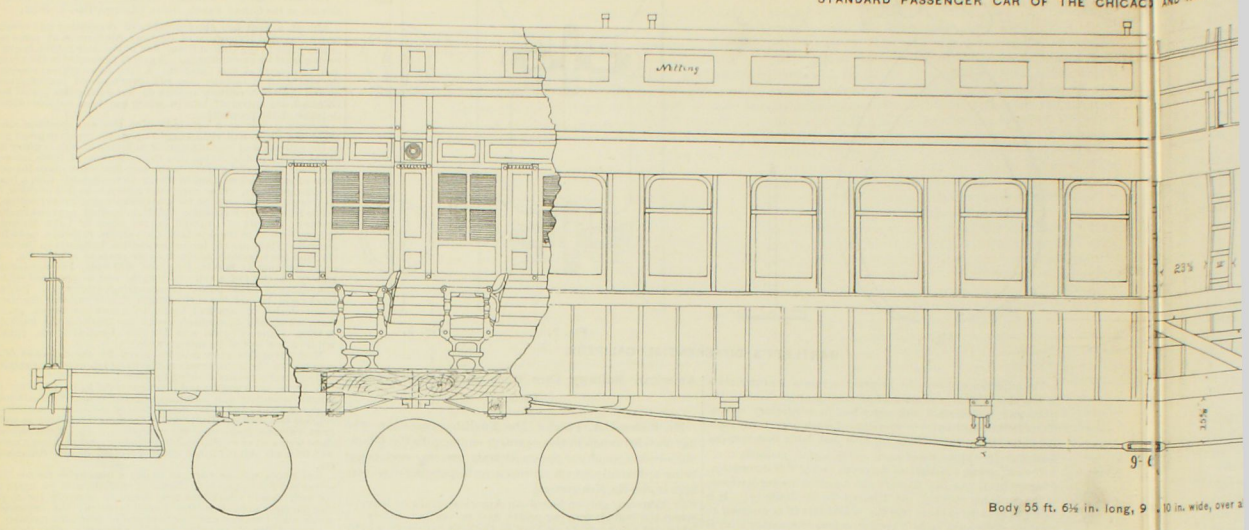
Lucius Fairchild, Ex-Governor of Wisconsin and late Minister at Madrid, Spain.
Geo. M. Pullman, President Pullman's Palace Car Co., Chicago.
Aaron French, Pittsburg Car Spring Co., Pittsburg.
J. McGregor Adams, Adams & Westlake Mfg. Co., etc., Chicago.
E. V. Cherry, Vice-President Post & Co., Railway Supplies, Cincinnati.
A. G. Darwin, President Allen Paper Car Wheel Co., New York.
O. W. Potter, President North Chicago Rolling Mill Co., Chicago.
H. E. Sargent, late General Manager Northern Pacific Railroad, Chicago.
James McMillan, President Michigan Car Co., etc., Detroit.
Geo. Westinghouse, Jr., Pres. Westinghouse Air Brake Co., etc., Pittsburg.
J. H. Bass, Proprietor Bass' Car Wheel Works, Fort Wayne.
E. H. Williams, Baldwin Locomotive Works, Philadelphia.
Wm. S Eaton, National Tube Works Co., etc., Boston.
Wm. Chisholm, President Cleveland Rolling Mill Co., etc., Cleveland.
Thomas M. Carnegie, Pres. Edgar Thomson Steel Co., etc., Pittsburg.
W. H. Doane, President J. A. Fay & Co., Wood Working Machinery, Cincinnati.
M. M. Buck, Railway Supplies, St. Louis.
C. W. Rogers, Vice-President Montgomery Stock Car Co., etc., New York.
John E. Green, Vice-President Louisville Railway Supply Co., Louisville.
H. Clay Evans, Vice-President and General Manager Roane Iron Co., Chattanooga.
C. D. Peters, Railway Supplies, London, England.
E. H. Talbott, President and Manager of *The Railway Age*, Chicago.

Executive Committee.—Hon. Lucius Fairchild, H. E. Sargent, A. G. Darwin, J. McGregor Adams, E. V. Cherry, E. H. Talbott.

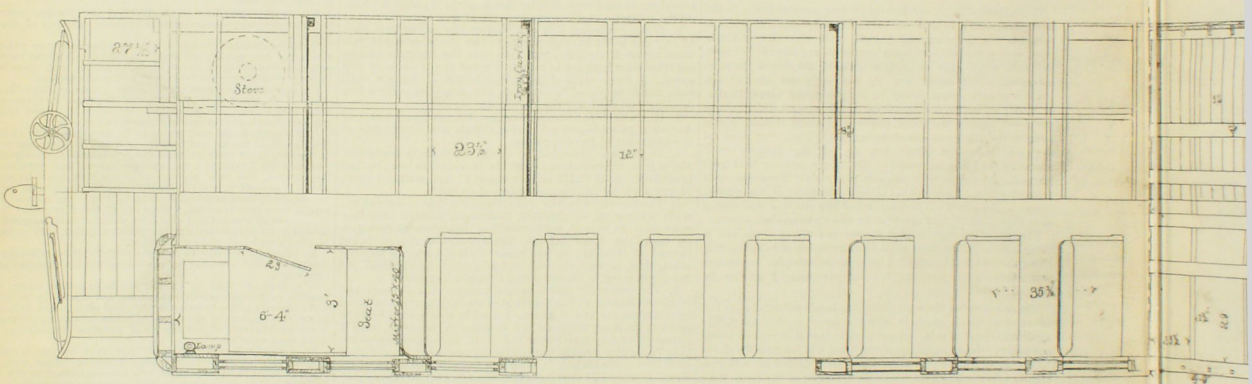
Officers.—President, Hon. Lucius Fairchild; Vice-Presidents, Geo. M. Pullman and Aaron French; Secretary, E. H. Talbott; Treasurer, J. McGregor Adams.

A NEW railway-brake mechanism has been invented by John W. Cloud, Altoona, Pa. The weight of the car is sustained by fluid pressure. When released, the brakes on the several cars composing the train are applied under different degrees of pressure, according to the varying loads on the cars.

STANDARD PASSENGER CAR OF THE CHICAGO AND NORTHWE



Body 55 ft. 6½ in. long, 9 ft. 10 in. wide, over a



Roof Frame and Seats.

The drawings represent the standard passenger coach of the Chicago & Northwestern Railway Co. In the absence of detailed specifications, we can only give the following general description, which covers the essential points in design, construction and finish.

The frame is of southern yellow pine, with the exception of door and corner posts, end plates and carlines, all of which are of seasoned ash. The body-bolsters are double, and of wrought iron. The inside finish, including seats, is mahogany. The seats are upholstered in crimson plush, the backs with gold-colored plush. Cobb's seat springs are used. There is a ladies dressing room provided with mirrors and other toilet conveniences. There is also a dressing room for gentlemen, the floor of which is covered with sheet copper with the edges turned up one inch at the sides. The car has no end windows. Ventilation is provided for by a swinging panel at each end of clear-story, through which the air is admitted after passing through an opening under the roof projection covered with wire gauze netting. The clear-story windows can also be opened and held in any desired position by means of catches, the entrance of dust and cinders being prevented by wire netting extending the full length on the outside. The ceiling is of bird's-eye maple put up in sections with joints covered with mahogany strips. The car is lighted by six lamps of the company's standard, made by the Adams & Westlake Co., and put up in pairs at proportionate distances for a proper distribution of the light. There are lamps also in the saloons. The basket-racks are handsomely designed, and all metal trimmings are of bronze. The water tanks in saloons are filled from top of car, and the water drawn through plated faucets in plated alcove at sides. The heating is by hard coal stoves, the openings in which are secured with locks so arranged that in case of accident no fire can escape. The heat is conveyed along the car sides in pipes, with registers between the seats. The stoves are inclosed in sheet iron casings, and the cold air admitted between stove and casing, where it is heated before entering the car. The admission of cold air is regulated by a valve.

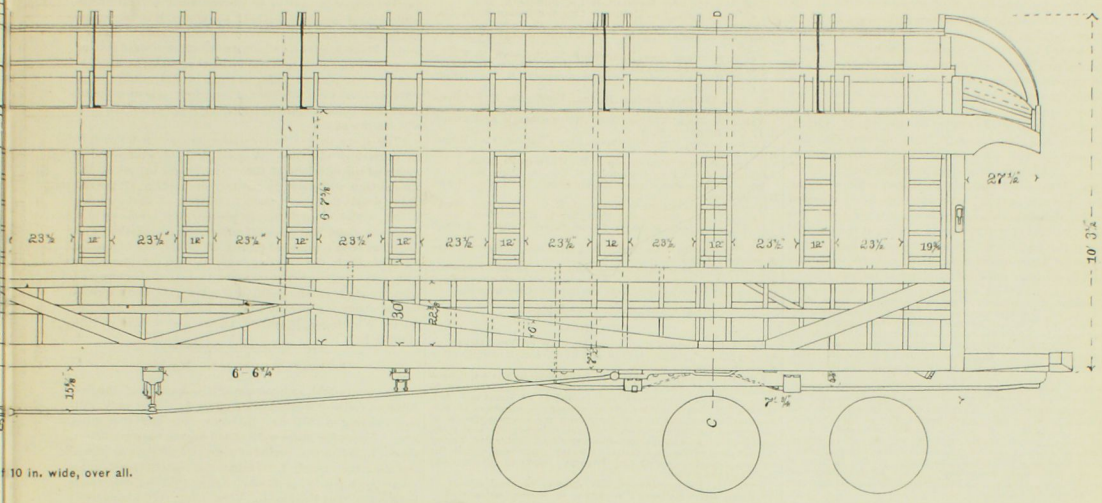
The cars have Miller hooks made of cast steel, and are also equipped with Westinghouse automatic brakes. The outside is finished with iron battens divided into panels. The body is painted a bright yellow or lemon color, neatly striped. The letter-board is ultramarine blue; the number in centre of car under window of same color; letters and number in gold shaded with red. The car runs on 6-wheel trucks with wood frames of seasoned oak. Wheels are 33 inch cast iron. The truck sides are plated with wrought iron, and have A. French & Co.'s springs. We shall illustrate in our next issue the road's standard 4-wheel truck.

A New Freight Car Heater.

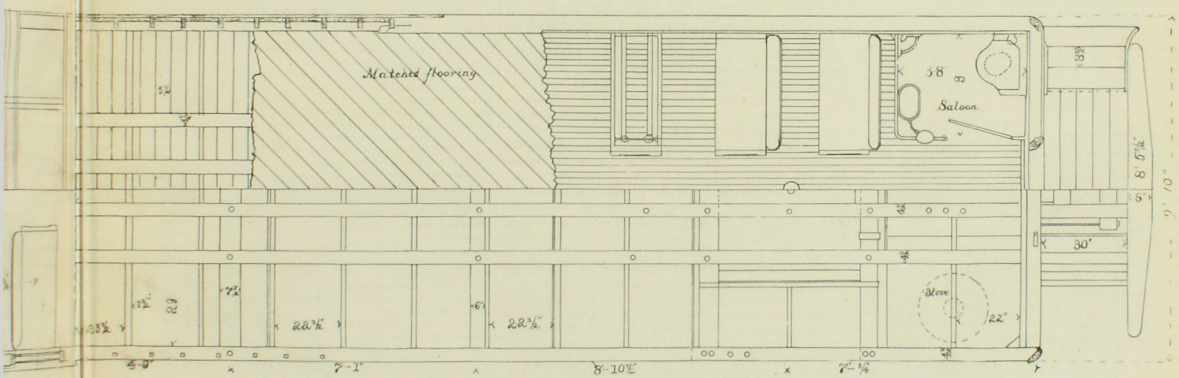
An automatic apparatus for warming cars carrying potatoes or other freight which must be kept from freezing is in operation on a car which recently arrived in Boston from Houlton, Me. The contrivance is such that a uniform temperature is maintained for many hours, and even days, by means of a self-regulating process which distributes the warm air by means of flues all around the car, so that no part of the freight is overheated or in danger of freezing, no matter what the outside temperature may be. Underneath the car floor, and extending nearly across the car, is a box some 24 inches in width and 18 inches in depth, in the center of which is an oil stove with asbestos wicks, into which oil is conveyed by a tube leading from an oil tank. This tank is an iron cylinder about 12 inches in diameter and placed close to the stove-box. Its length is equal to that of the fire-box, and it has in one end a glass tube to indicate the amount of oil in it. The oil tank will hold about 40 gallons, the cheapest kerosene being used, and in such a way that there cannot possibly be any danger from it. The oil is fed to the wicks in the stove through a tube, and the quantity is regulated by a valve attached to the ends of an upright brass rod. This valve is so adjusted on the rod that, when the surrounding air becomes very hot, the metal in the rod expands, and, in so doing, the lengthening of the rod by the smallest fraction of an inch presses the valve down and stops the supply of oil, and the flame goes down to a minimum. Now comes the reaction. The fire-box becomes cooler, the metal rod contracts, and in so doing becomes shorter, opens the valve to an increased flow of oil and a larger and brighter flame. Thus, of a cold night in winter, when the car is running, with a cold side wind blowing and the thermometer down to near zero, the cold that must find its way into the fire-box continually keeps a low temperature, contracts the rod, increases the flow of oil, puts on a stronger fire, and in this way keeps pace with the necessity for more protection to the perishable contents of the car.—*Condensed from Iron Age.*

ONE of the most beautiful passenger coaches we have had the pleasure of riding in for some time, we found a few evenings ago in a New York & Boston limited express train. It is one of a large number built during the past year at the New Haven shops of the New York, New Haven & Hartford road, a notice of which has already appeared in the CAR-BUILDER. The inside finish is in polished mahogany, the luster of which is enhanced, especially in the night time, by the light of three brilliant double-burner chandeliers. The main roof is narrow, and is set so nearly at a right angle with the side-walls, as to give the appearance of greater height and roominess to the interior, this impression being heightened by a handsomely designed transom light over each of the windows. In place of the ordinary parcel-racks are rings and hooks, which serve the same purpose without being so conspicuous. The ornamental paneling of the sides and ceiling is exceedingly beautiful in design and workmanship, but not at all showy or pretentious. The seats are a comfort to the sitter. It is, in fact, one of the cars, which, with a train that moves at 40 miles an hour, and starts and arrives on time, can hardly fail to satisfy the most exacting in the matter of luxurious traveling.

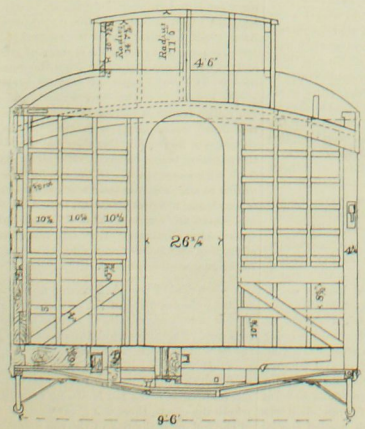
AND NORTHWESTERN RAILWAY COMPANY.



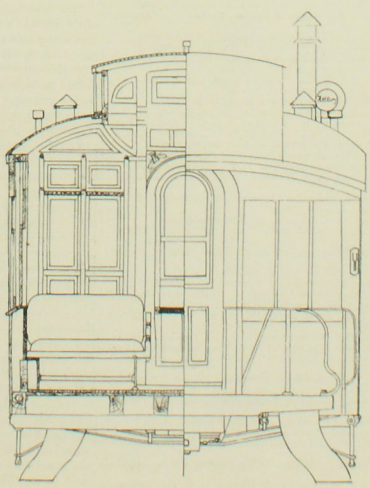
ft. 6½ in. long, 9 ft 10 in. wide, over all.



Floor Frame and Floor.



Section Through C D.



Section and End View.

The American Street Railway Association.

In response to a call issued early in November, the representatives of a large number of street railways in different parts of the country assembled at Young's Hotel, in Boston, on Tuesday, Dec. 12, and after a session of two days completed a national organization named as above. The proceedings were very harmonious throughout, and evinced a general concurrence in the proposal to form an association for the promotion of the interests of this class of railway companies.

The meeting was called to order by Mr. H. H. Littell, Superintendent of the Louisville City Railway Co., and Hon. Moody Merrill, President of the Highland Street Railway Co., of Boston, was appointed chairman.

Mr. Merrill then addressed the delegates, acknowledging the compliment to the road with which he was connected in selecting him to preside over the meeting, and also the compliment to the city of Boston in making it the place of meeting at this inclement season of the year. In regard to the objects of the proposed association, and the condition and growth of street railways, he spoke as follows:

"Some one may ask what interests in common affecting the street railways of the country, corporations local in their character can have that would seem to call for an organization for their protection? I would say that probably our association is not to be formed so much to protect our interests as to promote them. The street railways of this country have grown so rapidly during the past ten years, and are still growing with such rapidity, that some association of this character seems highly desirable.

"There are now organized and doing business in this country and Canada 415 street railways. These companies employ an army of about 35,000 men. They run 18,000 cars, which, with the horses attached, would make a solid line of cars reaching from Boston to Albany. More than 100,000 horses are in daily use, and calculating that the average life of a horse in street-railway service is four years, it makes the consumption of horses 25,000 per year, a fact of much importance to the farmers of the country, East, West, North and South. To feed this vast number of horses requires annually 150,000 tons of hay and 11,000,000 bushels of grain.

"These companies own and operate over 3,000 miles of track, nearly enough to span the country from Boston to San Francisco. The whole number of passengers carried annually is over 1,212,400,000, or a number nearly equal to the entire population of the globe. The amount of capital invested in these railways exceeds $150 000,000, with absolutely no security but the faithful and satisfactory service rendered by the traveling public by the companies themselves. The objects of this contemplated association should be the advancement of scientific and practical knowledge in the construction, equipment and management of street railways. The public are continually requiring of us a better and higher order of service; for while, ten years ago, the street cars were run almost exclusively for the accommodation of the poorer and middling classes, now the wealthier classes are our most liberal patrons. A few years ago the cab and the hack were the only vehicles called in requisition for the lecture, the concert and the theatre, but now the street car is almost exclusively patronized for that purpose. Cars can be seen going to and from these places of entertainment, filled with ladies robed in silks, velvets and ermine, and adorned with costly jewels of emeralds, rubies and diamonds. The change in the character of our patronge demands continual improvements in our service. It would seem to be important that there be established some central office or bureau, where the improvements in the service of the different companies could be reported, and where all reports of the decisions of the courts in patent cases and damage suits affecting street railways should be kept, so that any member of the association could have access to them.

"There should also be kept at this office correct information concerning the state of the horse, hay and grain markets in the different sections of the country, so that reliable information concerning all these vital interests can be obtained at all times. Other interests of equal or of greater importance than these I have mentioned will undoubtedly occur to you. Let your deliberations be thoughtful and harmonious, and your actions such as to command the support and hearty co-operation of every street railway in the land."

The following is a list of the delegates and the roads represented:

Calvin A. Richards, Pres. Metropolitan R. R. Co., Boston, Mass.
Wm. H. Hazzard, Pres. Brooklyn City R. R. Co., Brooklyn, N. Y.
A. L. Richards, General Manager, Cambridge Road, Boston, Mass.
Jacob Rehm, V.-Pres. North Chicago S. R. Co., Chicago, Ill.
L. Braytoo, Pres. Union R. R. Co., Providence, R. I.
H. H. Littell, Gen. Supt. Louisville City R. R., Louisville, Ky.
T. L. Johnson, Pres. Citizens' S. R. Co., Indianapolis, Ind.
Moody Merrill, Pres. Highland Street Railway Co., Boston, Mass.
J. E. Rugg, Supt. Highland Street Railway, Boston, Mass.
Charles E. Powers, Pres. Middlesex R. R., Boston, Mass.
Princes Bates, Supt. South Boston R. R.
William Reed, Treas. South Boston R. R.
Amos F. Breed, Pres. Lynn & Boston Road, Lynn, Mass.
E. T. Northend, Newburyport R. R. Co.
J. A. Chaces, Gen. Manager Lowell Horse R. R. Co.
Abner C. Goodell, Pres. Naumkeag R. R. Co., Salem, Mass.
Willard B. Ferguson, Supt. Naumkeag R. R. Co., Salem, Mass.
S. A. Green, Supt. Lynn & Boston R. R. Co., Boston, Mass.
Geo. C. Morse, Supt. Taunton R. R. Co., Taunton, Mass.
Wm. W. Cross, Pres. Brockton R. R. Co., Brockton, Mass.
Horace B. Rogers, Supt. Brockton R. R., Brockton, Mass.
Warren Ladd, Pres. New Bedford & Fairhaven R. R. Co., New Bedford, Mass.
Geo. W. Duncan, Manager Haverhill & Groveland R. R., Haverhill, Mass.
F. E. King, Supt. Springfield S. R., Springfield, Mass.
M. C. Foster, Supt. Albany & West Troy R. R., Albany, N. Y.
Geo. B. Kerper, Pres. Mt. Adams & Eden Park R. R. Co., Cincinnati, O.
C. B. Clegg, Pres. Oakwood S. R. Co., Dayton, O.
Chas. Hathaway, Pres. Superior S. R. Co., Cleveland, O.
F. D. Robison, Representing City R. R. Co. of Cleveland, O.
F. E. Seagrand, Pres. Central Passenger Co., Toledo, O.
W. W. Bean, Pres. Newport & Dayton R. R. Co., Dayton, Ky.
Joab Mulvane, Pres. Topeka City R. R. Co., Topeka, Kan.
Albert Eames, Pres. Bridgeport R. R. Co., Bridgeport, Conn.
B. F. Lashar, Supt. Bridgeport Horse R. R., Bridgeport, Conn.
H. S. Searles, Treas. and Supt. Worcester Street R. R., Worcester, Mass.
D. F. Longstreet, Sec. and Treas. Union Co., Providence, R. I.
Moses Humphrey, Pres. Concord R. R., Concord, N. H.
J. J. Franklin, Supt. Toronto R. R., Toronto, Ont.
John Crawford, Pres. Montreal City Passenger Railway Co., Montreal, Can.
T. H. Robillard, Supt. Montreal City Passenger Railway, Montreal, Can.
J. L. H. Cobb, Pres. Lewiston & Auburn R. R. Co., Lewiston, Me.
E. P. Stinchfield, Supt. Lewiston & Auburn R. R., Lewiston, Me.
Alfred Egerton, Supt. Albany R. R., Albany, N. Y.
S. S. Spaulding, Pres. Buffalo E. side R. R., Buffalo, N. Y.
H. M. Watson, Pres. Buffalo S. R. Co., Buffalo, N. Y.
C. C. Woodworth, Sec. Rochester City & Brighton R. R. Co., Rochester, N. Y.
Chas. Cleminshaw, V.-Pres. Troy & Lansingburgh R. R. Co., Troy, N. Y.
Wm. N. Morrison, Supt. Bushwick R. R., Brooklyn, N. Y.
Geo. B. Kerper, Union Passenger R. R. Co., Baltimore, Md.
Wm. T. Richardson, Sec. Atlantic Avenue R. R. Co., Brooklyn, N. Y.
Dr. A. B. Whitney, Harlem Bridge, Morrisania & Fordham R. R. Co., New York City.
Walter A. Jones, V.-Pres. New Williamsburgh & Flatbush R. R. Co., Brooklyn, N. Y.
Thomas Lowry, Pres. Minneapolis Street Railway Co., Minneapolis, Minn.
D. Atwood, Supt. Minneapolis S. R., Minneapolis, Minn.
Julius S. Walsh, Pres. Citizens' S. R. Co., St. Louis, Mo.
Allan A. Rabineau, Grand Rapids Street R. R. Co., Grand Rapids, Mich.
Henry Bond, Waltham & Newton R. R. Co., Waltham, Mass.
Thomas Lowry, Director St. Paul City R. R., St. Paul, Minn.
J. A. Chase, Gen. Manager Lowell Street Railway, Lowell, Mass.

Mr. Woodworth, of Rochester, and Mr. Clegg, of Dayton, were chosen Secretaries.

A large number of letters were read from persons connected with street railway companies, apologizing for their unavoidable absence and cordially approving the objects of the meeting.

The following constitution was adopted:

CONSTITUTION.

ART. I. The name of the Association shall be THE AMERICAN STREET RAILWAY ASSOCIATION, and its office shall be at the place where the secretary resides.

ART. II. The object of this Association shall be the acquisition of experimental, statistical and scientific knowledge relating to the construction, equipment and operation of street railways, and the diffusion of this knowledge among the members of this Association, with the view of increasing the accommodation of passengers, improving the service, and reducing its cost; the establishment and maintenance of a spirit of fraternity among the members of the Association by social intercourse; and the encouragement of cordial and friendly relations between the roads and the public.

ART. III. The members of this Association shall consist of American Street Railway Companies, or lessees, or individual owners of street railways, and each member shall be entitled to one vote by a delegation presenting proper credentials.

ART IV. This Constitution may be amended by a two-thirds vote of the members present at a regular meeting, after the proposed amendment shall have been submitted, in writing, at the preceding regular meeting and a copy sent to each of the members.

By-laws were adopted providing for the election of a president, three vice-presidents, an executive committee of five, and a secretary and treasurer; also that the regular meetings of the association be held on the second Tuesday in October in each year, and that members shall pay an initiation fee of $25.

The constitution and by-laws having been signed by the delegates present, the association then proceeded to the election of officers, with the following result:

H. H Littell, President; W. H. Hazzard, 1st Vice-President; C. A. Richards, 2d Vice-President; G. B. Kerper, 3d Vice President: and Julius Walsh, Chas. Cleminshaw, Thomas Lowry, B. F. Longstreet, and J. K. Lake, Executive Committee.

The first regular meeting of the association will be held at Chicago, on the second Tuesday in October, 1883.

After the adjournment, the members of the association partook of a sumptuous banquet at Young's hotel, tendered them by the officers of the street railways of Boston.

Car Construction from a Lumber Trade Point of View.

The *Northwestern Lumberman* in an article on car construction says:

"While much the larger proportion of the materials used in general construction is pine, the building of cars calls mostly for oak. Hardly a third of the lumber in a car is pine, on the average.

"The dimensions used are by no means standard, the sizes of the stuff in a car being largely a matter of caprice, and depending also upon the relative egotism of various master car-builders. It is said there are not two in existence who have the same ideas about the exact way in which a car should be built, and not one that will admit that a contemporary genius is right in the matter. Of course there can be no very heavy difference in the sizes of stuff; but there is enough to produce confusion, and throw uniformity to the dogs. Nor does each architect for cars stick to his original plan. He may have half a dozen ideas about one batch of cars, and introduce that many styles into the order before all the material for the job has been supplied by the contractor. In short, nearly every designer believes his methods and taste superior to those of others, and there is hardly such a thing as conventionality in the business. Various roads will devise ways, means and patterns of their own, and hold themselves thoroughly independent of the modes of others. This inclination with car-builders is the bane of the contractors' life. Every man who furnishes stuff for cars is anxious that some sort of regularity should prevail, so that standard dimensions could be safely handled and kept in stock. But such an arrangement has never been possible. Scarcely anything in the way of lumber is supplied except as ordered, when it is then cut from the rough; and the order is frequently changed in many particulars after it is given, and often more than once. It has been a fact that where a railroad had a half-dozen different shops located at various points along its lines no two of them were found to want the same sizes of stuff. What would do for one shop was next to worthless for another, so that each needed special dimensions gotten out constantly. One shop could not be supplied in an emergency from the surplus stock of another, and if stuff should be cut for a certain shop and not used, a great deal of it was wasted. Some companies have finally adopted a system to govern their several shops, while with others there has been no reform. It is, hence, useless to attempt an enumeration of prevailing sizes in the stuff used. There has been an industrious effort toward getting the roads to adopt a uniformity in the trucks, at least, so that the bumpers of different cars would readily come together; but even this has not been done, a bent coupling link often being required, while, in some cases, the cars will not jibe at all.

"The more or less fancy passenger cars are finished in all degrees of elegance. A good deal of whitewood is used, and the interiors of the various cars in use at the present time will show, in one way or another, all the finishing woods that are suitable. Instead of dark, sombre shades, which were formerly popular, the tendency now is toward light and cheerful effect. It is remarked that there has been a material falling off in the use of walnut for car finish in the last two years, though considerable is still employed. Cherry, ash, white oak, mahogany and whitewood are among the more staple woods, and a sprinkling of ebony is generally thrown in to heighten the contrast. Whitewood, basswood, cherry and walnut go into blind slats."

Railway Progress in Mexico.

The twenty-fifth anniversary of the opening of the first Mexican railway was celebrated July 24. The only railroad existing in 1857 was between four and five miles long. About 300 miles were added during the next fifteen years. In 1877 a new period of railway activity was begun, and since then nearly 2,000 kilometers—about 1,200 miles—have been put in operation. Before 1877 the only roads built were from Mexico to Vera Cruz, 471 kilometers; Vera Cruz to Jalapa and Coatepec, 144 kilometers; and various tramways aggregating 140 kilometers.

The roads now in operation or in process of construction are given officially as follows:

	Kilometers.
Vera Cruz to Mexico City, and branch to Puebla	371
Vera Cruz to Jalapa and Coatepec	144
Vera Cruz to Medellin	22
Esperanza to Tehuacan	50
Merida to Progreso	36
Mexico City to Leon (Mexican Central)	409
Mexico City to Toluca (Mexican National)	73
Mexico City to Cuantla Morelos	138
Paso del Norte to Chihuahua (Mexican Central)	360
Puebla to San Martin	38
Puebla to San Marcos	34
Nera Cruz to Anton Lizardo and Alvarado	25
Vera Cruz to Jalapa and Chalchicomula	19
Pachuca to Irolo and Teoloyucan	45
Altata to Culiacan	30
Meridan to Peto	26
San Luis Potosi to La Soledad (Mexican National)	6
Tampico to San Luis Potosi (Mexican Central)	38
Mexico City to El Salto (Mexican National)	83
Matamoras to Monterey (Mexican National)	7
Zacatecas to San Luis Potosi (Mexican National)	23
Mexico City to Toxoco	28
Nuevo Laredo to Monterey (Mexican National)	170
Guaymas to Magdalena	200
Puebla to Matamor s Izucar	23
Chalco to Tlalmanleo	15
Tramways in federal districts, City of Puebla, and City of Guadalajara	130
Total	2,026

This is equal to 1,632 English miles.

The Mexican National Railway, from Corpus Christi, Texas, reached Monterey, a distance of 333 miles, Aug. 31. —*Scientific American.*

THE Sacramento *Record-Union* describes a private car recently constructed at the Central Pacific shops at that place for Mrs. Leland Stanford. Its length over all is 70 feet and width 12 feet. It runs on 6-wheel trucks and has Allen paper wheels. Under the central part of the body are extensive lockers for the storage of provisions. These lockers can be entered either from the outside or inside of the car. Hot water pipes are used for heating and for supplying hot water to the several rooms and compartments. The entire frame of the car is of Oregon pine. The exterior finish corresponds with that of the passenger car standard of the road. The sides are smooth, the joints of the paneling being covered with strap iron rabbeted in flush with the surface. In the interior the panels are all unlike in size, also the spaces between the windows, the object being to break the usual monotony where the panels and spaces are regular. The style of finish is modified Queen Anne, extremely rich but not gaudy. There are eight 28 × 38 windows on a side. The car weighs about 35 tons and cost over $20,000.

A good deal of trouble is caused on some of the western roads by the buckling of the rods of continuous draw-bars, so that in making repairs an engine is required to pull the rods out. There is complaint also about the breaking of the eyes in the ends of the rods. In such cases the eye is punched without any enlargement in the rod to increase its strength at that point. It must be obvious to any good mechanic that if the rod is strong enough in section area where the eye is, there is a great waste of metal in the rest of the rod, or if the rest of the rod is just right, it is much too weak at the eye.

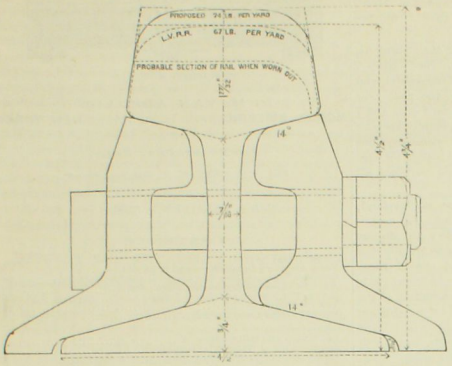


Fig. 1.

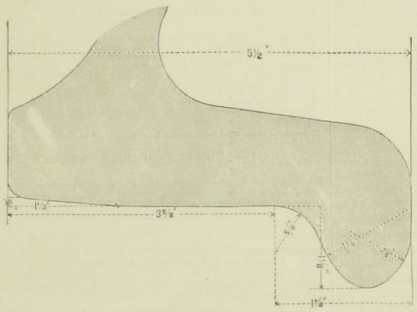


Fig. 2.

SAYRE'S RAIL SECTION AND WHEEL TREAD.

The cuts represent a form of rail section and wheel tread designed by Mr. Robert H. Sayre, late Superintendent of the Lehigh Valley Railroad, the object of which is to make wheel and rail fit each other so as to prevent the wear of wheel flanges. The top line of rail, Fig. 1, is on a basis of 74 pounds to the yard, and is Mr. Sayre's latest design, which is similar in all respects to the 67-pound rail designed by him and now in use on the road, except that the head of the rail is ¼ of an inch higher.

It will be seen that as the base, stem and a certain portion of the head are not worn out, but that after wearing down, say ¼ an inch of the head, the rail must be renewed for want of sufficient strength, any increase in weight put into the head would add to the life and value of the rail to a degree very much exceeding the increased cost. Assuming that the 67-pound section may be worn down ¼ an inch, as indicated by the dotted line, there will be ⅞ of an inch to wear down in the 74-pound section, thus giving 50 per cent. more wearing value for about 10½ per cent. more weight of rail, or cost. Taking a road with a business that would wear the 67-pound rail ¼ an inch in 10 years, the 74-pound rail would wear, with the same traffic, 15 years, and the comparative cost would be :

67 lb. rail, 105.3 tons per mile, at $45	$4,738.50
74 " 116.3 " " at $45	$5,233.50

Then, leaving out of the calculation the value of the worn-out rails, which would be the same in both cases, we have :

4,738.50	
10	$473.85 per annum.
5,233.50	
15	$348.90
Interest on excess of original cost	29.70
	378.60 "
Saving per annum per mile	$95.25

In addition to this saving, the width of the top of head and the angle of sides being preserved, the width of the head at the bottom is increased, thus giving additional metal to resist flange wear and a broader bearing for the fish-plate.

Fig. 2 is a section of wheel tread and flange of a form best suited to the rail. It will be observed that the portion of the tread which runs on the rail is straight, and the remainder beveled towards the edge. The curve of the throat of the wheel corresponds with that of the corner of the rail, the object of which is to make a bearing surface of the corner in curving. The top of the rail being slightly convex, the wheel, when the rail is new, bears upon the centre, the subsequent wear of both producing a perfect fit. The angle of the sides of rail is 9°, he figure having been left out of the cut by the engraver

THE C. B. & Q. shops, at Aurora, Ill., have been busy overhauling 12 engines. The use of improved templets enables the shops to produce standard work in this branch of construction. A good deal of work is also doing in the way of general repairs.

THE Chicago & Alton shops at Bloomington, Ill., have built six 4-wheel switching and four 8-wheel passenger engines during the past ten months. Two more passenger engines are to be built. Mr. Wilson's new balance valve is showing much better results than the ordinary plain slide valve. Six new chair cars have also been built. A new addition, 400 feet in length, will soon be made to the machine shops.

THE Wabash, St. Louis & Pacific road will build new shops at Andrews, Ind. At the Springfield shops 9 engines are being overhauled and one new one built. Chilled pedestals are used on engine truck frames, and machine work is done away with in the fitting of brasses in engine truck boxes. Mr. Johann's plan of staying crown sheets directly to the boiler shell over head saves $300 on the ordinary crown bar construction.

AT the Union Pacific shops, at Omaha, a number of emigrant day cars are being altered into emigrant sleepers. The shops have just completed 100 narrow-gauge coal cars and are also building 50 narrow-gauge box cars for the Denver & South Park division. Vacant numbers are also being supplied in the standard freight equipment, and in the locomotive department several engines are being overhauled. The working facilities are just now somewhat limited by moving into the new car shops.

THE Edgar Thomson Steel Works, at Pittsburg, Pa., have commenced making steel in the same manner as it is made at the South Chicago Steel Works and at several of the steel works in Europe, namely, by running the molten pig iron directly from the blast furnaces into the converters, thus obviating the melting of the pig iron in cupolas.

THIRTY daily inspections of cars of the St. Louis & San Francisco Railway equipped with the American Brake Co.'s Automatic Freight Car Brake, show that during the month of November 690 cars were inspected, of which only 49 needed repairs of brake and putting on of new pieces. The cost of such repairs and new pieces was $18.68. Of these, 38 were of the horizontal pattern, and 11 of the upright pattern.

THE shops of the Pittsburg, Fort Wayne & Chicago road, at Fort Wayne, Ind., have built during the past year 14 Mogul (Class E.) engines, and have begun on 5 six-wheel connected shifting (Class H.) engines, besides overhauling six engines per month. They are also engaged in completing 250 stock cars at the rate of five a day. The cars are equipped with the Safford draw-bar. Mr. Casanave, the new master-mechanic, is from Altoona, and may be regarded as a representative type of a new order of this class of railway men whose services seem to be coming into demand. He is thoroughly posted in the theoretical and scientific as well as the practical part of his business, and is, withal, a gentleman of attractive and engaging personal qualities. His shop has within the past year received $60,000 worth of new tools and machinery, among which are a special planer for frames, another for rods; a milling machine, and a frame slotter for slotting two pairs of jaws at once. The "piece" system prevails here, and is productive of a very considerable saving. The extended smoke-arch is in general use on the engines of the road. In the round-house is kept a small shifting engine constantly under steam, which has been fitted with a steam pump, by means of which locomotive boilers are washed out. It also serves as a protection against fire. There is, however, a noticeable lack of one progressive feature, and that is overhead hoisting gear for removing driving wheels, the old-time "jacking-up" method being still used. All bolts used in locomotive work are taper, and are kept in stock. In repair or new work, after running a reamer into a hole, it is only necessary for the machinist to return the reamer and receive bolts from the bolt department that are certain to fit and drive slightly. This is accomplished by the use of block templets into which all bolts are fitted. When a reamer wears too much it is reduced to the next smaller size. These reamers differ $\frac{1}{32}$ of an inch; therefore, if in overhauling an engine a bolt is found which fits too loosely, the next larger reamer is run into the hole, and the corresponding bolt obtained, there being no time lost in ordering bolts from the smith-shop or waiting for them to be turned.

Fuel Consumption of American and English Locomotives.

The *Railroad Gazette*, of Nov. 3, contains a communication from Mr. Edgar Worthington, referring to a letter of mine, in a previous number of that paper, on the performance of English locomotives. After speaking of my letter as being "dreadfully prejudiced," he says :

In England every locomotive superintendent knows how much coal each of his engines is burning, but not always how much work each is doing; for the locomotive department seldom keep a record of the number of carriages in a train. In America few railroad companies seem to keep accurate statistics of the coal burned per mile. Seeing, then, that the foundation facts are so incomplete, it is impossible to draw an exact comparison.

We may start, however, with Mr. Webb's statement that his coupled engines (17×24) burn at least 30lbs. of coal per mile; and we know that the load on such trains varies between about 8 and 17 English six-wheeled coaches. On the other hand, we may take, for example, from your Locomotive Returns list for June, 1882, a heavy train average of 5.25 passenger cars, and find that the coal burned per mile is 62 lbs. Now, roughly speaking, this means as follows :

That the American engine with 5.25 cars burned twice as much coal as the English engine, each hauling about the same weight. This is on the supposition that an English six-wheel carriage weighs about half as much as an American car.

As an individual instance of economy, I have known an English engine with one pair of driving-wheels to work the "Irish mail" of five or six-wheel carriages for a month on 23 lbs. of coal per mile; but that was largely due to the extreme care in firing.

From this, and from an immense mass of other indications (I do not like to call it evidence, because it is not exact enough), we cannot help concluding that American engines burn more coal per weight hauled.

I cannot close without indicating what appear to me the three main points which make the consumption of an English engine lower than that of an American, and these are :

1. The loss by friction on curves in America is greater.
2. The grades in America are more frequent.
3. The entire heating surface of English engines is of copper or brass, which has a conductivity for heat of say 100; while the entire heating surface of an American engine (though the fire-boxes are slightly thinner) is of iron or steel, whose conductivity in comparison is only 15.8.

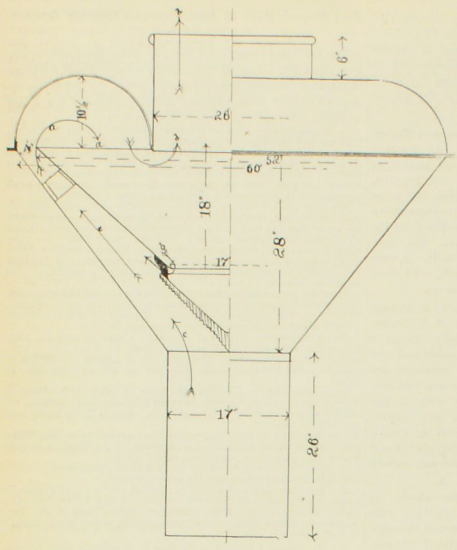
To the above I would reply that it is rather late in the season for sour grapes. On a road on which I was employed, a few years ago, passenger engines with 17 × 24-in. cylinders and 5 ft. 6 in. drivers pulled a train of four passenger and three baggage cars and consumed from 50 to 55 pounds of soft coal per mile. I made some diagrams from these engines and suggested a change in the valve motion, the result being a consumption of from 40 to 45 pounds only per mile, with same train and same run. As this road is only one of many of the same kind in this country it would seem that Mr. Worthington's statement that American engines burn 62 pounds per mile is incorrect or else the engines referred to were not in good condition. Mr. James McMeehan, the General Master Mechanic of the Cincinnati, New Orleans & Texas Pacific road, has passenger engines that haul trains of six and seven passenger cars and burn only 39 pounds of soft coal per mile. These cars have 6-wheel trucks, and weigh from 25 to 28 tons each.

Mr. Worthington's statement in regard to the heating surface of English and American engines, is equivalent to saying that copper is capable of conducting or transferring, in round numbers, *six* times as much heat as iron. Haswell's Pocket-Book for Mechanics says that copper has a conducting power represented by 845, while wrought-iron is 436 and steel 397; or, in round numbers, copper has but twice the conductivity of iron and steel. Molesworth, an English authority, puts copper at 898 and iron 347, and Gannot's Physics at 897 and 374, respectively; or, in round numbers, making the conducting power of copper only 2½ times that of iron. This reduction of 6 to 2½ puts a different face on the alleged superiority of English engines. I have no time to examine any more of the "facts" which Mr. Worthington asserts with so much assurance. The result would probably be the same as indicated above; and when it comes to a test of the two classes of engines on the same track, the arrogant claims of English superiority would yield, as in more than one instance heretofore, to the conclusive evidence of demonstration.

FRANK C. SMITH.

ON the 17th of June last, what is called the "two-hour" train between Philadelphia and New York, made the extraordinary run over the Bound Brook division of the Philadelphia & Reading road, of 49.1 miles in 50 minutes, and this, we are informed, is a fair average of the daily performance of engine "222" on the same section of road, with a train of five passenger coaches. The maximum upgrade of track is 62 feet per mile. The engine has Wootten's fire-box (114 inches long by 96 inches wide), but in other respects does not differ from ordinary engines in its general construction. The cylinders are 18½×22, diameter of drivers 68 inches diameter of boiler 52 inches and weight 80,000 pounds. The speed attained is solely due to the size of fire-box and the peculiar distribution of heating surface, which, although excessive in the aggregate, has a much larger proportion of it in the fire-box than usual, thus insuring an almost unlimited supply of steam. Five coaches are not a heavy train, to be sure, but the weight is fully up to the average of the English fast running trains.

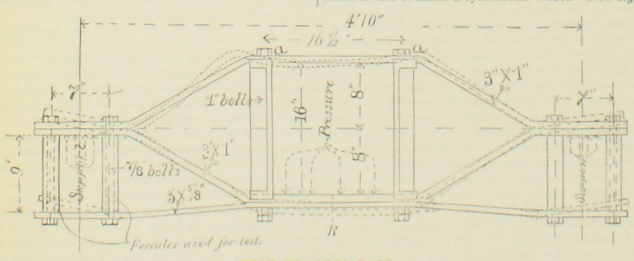
DAYLIGHT can now be seen through the tunnel at Weehawken through which the West Shore Railway will run. The great bore is 4,000 feet long, and cost $1,250,000 to build. The eastern approach has been cut through a solid block of granite, and is 150 feet in length and 56 feet in width. The West Point tunnel is completed. It passes under the government grounds at West Point, and is the longest and most difficult tunnel on the line. The entire line from Weehawken to Buffalo is now under contract.



HEWITT'S IMPROVED LOCOMOTIVE SMOKE-STACK.

THE engraving illustrates an improved locomotive smoke-stack designed by Mr. John Hewitt, Superintendent of Machinery of the Missouri Pacific road. The object of the inventor is to obtain a stack, without netting, that will prevent the throwing of sparks. Most of the engines of this road are fitted with these stacks, and are found to throw much fewer sparks than those with the ordinary stacks. The cinders strike the cone and follow the arrows *c c*; they are then deflected in the direction indicated by the arrows *a a*, the smoke passing out of the stack at *d*, while the cinders, from the momentum given them by deflection, are thrown down into the top side of cone, and are then taken by the induced current in the direction of the arrows *b b*, and then round again until they are beaten to dust and escape with the smoke. This stack, it is claimed, gives much less back pressure than the ordinary stack, and as a live spark killer it is said to be a complete success.

MR. JOHN P. MAHER, of Reading, Pa., has patented an improvement in the construction of box freight cars, and a car has been built in accordance with the improved plan, at the shops of the Philadelphia & Reading road in that city. The improvement consists in making the body of the car independently of the floor frame by means of sub-sills and stringers, which are fastened to the frame by bolts, and by taking out the bolts the body can be removed from the substructure for the purpose of facilitating repairs, etc. An improved system of tightening braces is also a feature of his invention. The increased weight of this method of construction is said to be only 450 pounds, which is more than offset by the many advantages secured.



TEST OF ARCH-BARS.

The diagram shows the results of a test recently made of arch-bars of freight truck of the Cincinnati, New Orleans & Texas Pacific road. The oil-boxes not being fitted, iron ferrules were put over bolts, as shown, which were of course not quite as strong as the boxes would have been. At the points indicated by "support" and "pressure," solid blocks were placed so that the pressure was distributed in much the same manner as if there had been spring-plank and boxes. At 35 tons, there was a deflection of ¼ an inch at *R*, and at 39 tons, the bars yielded, as shown by the dotted lines. The bolts at *a a* bent a trifle directly under the heads, but, in other respects, the bolts and castings remained as good as new.

THE Laconia Car Co., at Laconia, N. H., are building passenger cars for the Atchison, Topeka & Santa Fe road. They are extra large size.

THE Columbus shops of the Columbus, Hocking Valley & Toledo road, have 7 engines constantly inhand for repairs, and have turned out during the past year about 2 cabooses, 38 standard coal and 7 side dump cars per month, besides keeping the numbers full. The company has lately put in five new steel boilers for stationary engine and heating purposes, all built by themselves.

THE C. C. C. & I. shops, at Cleveland, have built one Mogul engine a month during the past year. They are similar in all respects to the Brooks Moguls, the company having purchased one of these engines as a sample to build from. It is said that the locomotive equipment of the road will soon be increased by the addition of several 8-wheel engines with 18x24 cylinders, and that a Burnside engine will probably be purchased to copy from. Several engines are being overhauled; and at the Delaware shops three engines are constantly in hand for repairs. A new paint shop has been built at the latter place with a capacity for six coaches, and a new shop has also been completed, except the power and tools, at which all the iron bridges of the road are to be built. The paint shop turn-table, recently put in, has given way under the weight of a loaded flat car, although it was designed for passenger coaches.

Cone and Straight Wheels.

The question of cone vs. straight wheels is receiving a good deal of careful thought, both among wheelmakers and railway men. Mr. Leander Garey expressed the growing ideas very clearly when he asked the question whether the elevation of the outer rail is not intended to obviate all the advantages to be gained from coning. The theory of the coned wheel is, that when running around a curve the wheel hugging the outer rail runs upon a larger diameter than the wheel which is slack from the inner, and consequently runs upon the outer portion of its tread. This is all right, but to prevent the wheel from hugging the outer rail we give the rail a considerable elevation, so that when we have done just what we would like to, the car runs around the curve with each wheel in the same relative position to the rails as on a straight track. Again, when a car truck goes around a curve it almost invariably does so in a corner-wise fashion. A pair of trucks illustrates this in a still more remarkable manner, for the leading truck is likely to bear against the outer rail, while the trailing truck is, to say the least, slack from it. If coning, then, is good for the leading wheels of the leading truck, it is worse than useless for the trailing axle of the trailing truck, for in the latter case the wheel running the largest distance is bearing on its smallest diameter, and the wheel running the shortest distance is on the largest, so that the amount of slipping between the two wheels on the same axle must be at a maximum instead of the minimum desired. Even on a straight track it is questionable whether coned wheels are at all desirable. Many of our most experienced wheel manufacturers, when left to exercise their own judgment, make a wheel in which the coning is very slight indeed, though they do not think it best to make a cylindrical wheel.—*Iron Age.*

A COMPANY has been incorporated, at Albany, N. Y., for the manufacture, use, lease and sale of instruments for the indication of time by electricity. The incorporators express no doubts that in the principal establishments of large cities, where correct time is a necessity, the clock will soon be a thing of the past. A synchronized dial-plate, connected with a central time piece, will take its place. The Elevated Railway Company of New York is completing arrangements for placing in all its stations synchronized dial-plates connected with a standard time piece. The new company aforesaid is about to introduce the practical workings of its invention to the New York business community.

NATIONAL CAR BUILDER

PUBLISHED MONTHLY
BY
R. M. VAN ARSDALE,
MORSE BUILDING.....NEW YORK.

JAMES GILLET, Editor.

FRANK C. SMITH, M. E., ASSOCIATE EDITOR.

JANUARY, 1883.

CONTENTS.

ILLUSTRATIONS: Page.
Early American Locomotives and Railroads 3
Standard Passenger Coach—Chicago & Northwestern Ry..... 6
Hewitt's Improved Locomotive Smoke-Stack..... 10
Sayre's Rail Section and Wheel Tread..... 9
Test of Arch-Bars..... 10
Bartlett's Differential Calipers..... 5

COMMUNICATIONS:
Car-Wheels and Rail Sections..... 4
Consumption of Water by Locomotives..... 4
Construction of Freight Car Trucks..... 4

EDITORIALS:
Our Wonderful Railway Mileage..... 10
English and American Locomotives 11
Car Ventilation..... 11
Economy in Locomotive Performance..... 11
The Car-Coupling Problem..... 11
National Exposition of Railway Appliances 11

MISCELLANEOUS:
National Exposition of Railway Appliances..... 5
New Freight Car Heater..... 6
New Shops of D., L. & W. R. R., at Dover, N. J..... 4
American Street Railway Association..... 8
Car Construction from a Lumber Trade Point of View..... 8
Railway Progress in Mexico..... 8
American Railway Cars from an English Point of View..... 5
Cone and Straight Wheels..... 10
Fuel Consumption of American and English Locomotives..... 9
Is this Stewarts' Crossing ?..... 12

EDITORIAL ANNOUNCEMENTS.

Addresses.—*Business letters should be addressed, and drafts and money orders made payable, to* THE NATIONAL CAR-BUILDER. *Communications for the attention of the Editor should be addressed* EDITOR NATIONAL CAR-BUILDER.

Advertisements.—*Nothing will be inserted in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.*

Contributions.—*Articles relating to railway rolling stock construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.*

Special Notice.—*As the* CAR-BUILDER *is printed and ready for mailing on the last day of the month, advertisements, correspondence, etc., intended for insertion, must be received not later than the 25th day of the month.*

SUBSCRIPTIONS *to the* CAR-BUILDER *will be received, and copies kept for sale, at the following places:*

A. WILLIAMS & CO., *383 Washington St., Boston, Mass.*
L. SCHAFFNER, *Cigar and News Dealer, Grand Pacific Hotel, Chicago, Ill.*

WILLIE H. GRAY, *306 Olive Street, St. Louis, Mo.*
ROBERT CLARKE & CO., *65 West Fourth Street, Cincinnati, Ohio.*

BOUND volumes of the NATIONAL CAR-BUILDER for 1882 are now ready. Price $3. Bound volumes for 1881 can also be furnished.

OUR WONDERFUL RAILROAD MILEAGE.

The year 1882 closes with a record of new railroad construction in the United States approximating 11,000 miles. This is equal to the entire mileage in operation in 1851, and is an extraordinary score for a single year. The question is naturally suggested to cautious and conservative minds, whether this development is excessive and likely to be followed by a reaction that will have an injurious effect on collateral industries. An ambition to excel the rest of the world in industrial progress is characteristic of our people, and we take a peculiar pride in exhibiting the marvelous growth of the country from year to year in the matter of railroad mileage and the increase of freight tonnage. We have the largest rivers and lakes, a magnificent coast-line, a vast area of territory, and a wealth of resources in natural productions that can hardly be estimated. To equalize things, we must have internal transportation facilities on a corresponding scale. Our great water ways must be supplemented by railroads penetrating into all the waste places of the continent. The prevailing activity of the past two years in this class of enterprises, stimulated as it has been by the easy command of credit and capital, an enormous immigration, and a marked eagerness for speculative investments, has not been favorable to prudent forecast. Many new roads have undoubtedly been built, others projected and partly completed, and many extensions of old lines carried forward, that were in excess of actual wants, but they will all be needed. It is only a question of time. Upon this point the experience of the past would seem to be conclusive.

It would not be wise, however, to make the new construction of the past year a basis for calculating what the total railroad mileage of the country will be at the close of the century. By that time it is very likely that people will have become so accustomed to big figures and wonderful results, so far as railroads are concerned, that a few thousand miles a year, more or less, will not be regarded as anything worth crowing over. If the present year shall show an increase of mileage approaching that of 1882, it will certainly be something to wonder at; but we do not think that such a result is looked for by sagacious and far-sighted business men, nor do we think that the present abounding prosperity of the country will be perceptibly abated if the mileage should fall a few thousands behind last year's figures. Nothing but a short crop of cereals can work serious mischief to the business interests of the country.

ENGLISH AND AMERICAN LOCOMOTIVES.

A recent number of the London *Engineer* contains some editorial remarks on American locomotives, in which special reference is made to the new engine of the Central Pacific road built for service on heavy grades. The writer asserts that two English engines with 18 × 24 cylinders would be superior to the engine of the Central Pacific. Mr. Stevens, the General Master Mechanic of the road, found upon trial of this engine that it was equal to two of his 18 × 24 link engines. Now, it is quite obvious that if this new engine is equal to two 18 × 24 American engines, it is certainly superior to two 18 × 24 English engines, and especially in view of the fact, of which there can be no question, that the American type of engines has always proved superior to the English type on the same track. The *Engineer's* preference of two engines to do the work of one tallies very well with the absence of bell-cords and other modern conveniences and safeguards in the running of English passenger trains. No manager of an American road would be so foolish as to incur the expense of repairs, fuel and crew for two engines, when such expense could be reduced one-half by using only one; and as for an engine at each end of a train, as the writer suggests, there are but few train men on our roads that would care to take the chances of piling up the cars by such an arrangement, in case of accident, when the practice, so common on our roads, of "double-heading" trains is equally effective and much safer.

As respects valve gear, the writer seems quite content with the English system, although Mr. David Joy says that the American link motion is much more "refined;" and as for the Joy gear, which has been trumpeted a good deal during the past year or two as a great improvement, Mr. Reuben Wells, the President of the Master Mechanics' Association, demonstrated before that body that there was no difference in results between it and the American link motion. A locomotive with this gear will require, at the most economical point of cut-off, an actual consumption of from 31 to 32 pounds of water per horse-power per hour. The *Engineer* has claimed heretofore that English engines used only 18 pounds, but this was the theoretical and not the actual consumption. Any of our high speed automatic cut-off stationary engines, all of which use the riding cut-off valve, in principle, at least, will develope a horse-power on an actual consumption of from 21 to 25 pounds of water per hour. The valve seats and valves of a link motion locomotive require to be faced every six to eighteen months. There have been riding valve engines on our roads that were almost identical with that of Mr. Stevens' engine, that did not require any work on valves or valve gearing in from three to five years, and this was due to the constant travel of the valves, there being no wire-drawing openings as with the link. These engines made an average mileage of 800 miles per week, and hauled trains of 700 and 800 tons. If the *Engineer* does not consider the use of 22 instead of 30 pounds of water per hour, and a valve gear that lasts two or three times as long as the link, as a step in the right direction—which Mr. Stevens' new engine certainly is—it must be owing to an inveterate and unreasoning attachment to old time systems and methods merely because they *are* old.

CAR VENTILATION.

A year ago or so, it was suggested by a contemporary journal that the subject of car ventilation should have an editorial airing at least once a year in every railroad paper. We readily fell in with the suggestion at the time, by contributing our first annual installment, so to speak, not because the subject itself was particularly in need of ventilation, but because there was a possible danger that it might drift out of sight and be forgotten. For several years it had been discussed at the annual and monthly meetings of the car-builders with an earnestness and enthusiasm commensurate with its importance, and if the subject was to be taken from the docket it was fitting that it should not be done too abruptly. The agitation was kept up so long that the inventions for providing the traveling public with pure air became so numerous that they could not all be fairly dealt with on their merits. There was an excess of devices, and the greater the excess the more difficult it was to pick out the best one. Pure air in cars was a dead sure thing, however. It only remained to be determined in what particular way the occupants were to take it. The room in which the car-builders' monthly meetings were held, was on several evenings during the period referred to, turned into a kind of laboratory, in which learned professors illustrated and explained the mysteries of the atmosphere, analyzed its chemical properties, classified the noxious gases and set forth the deadly nature of the organic and morbific matter generated by people in railway cars. Carbonic acid was severely handled, although its exact location in a car could not be satisfactorily determined. Special attention was given to the movement, force and deflection of air currents and their effect upon the health and comfort of passengers, the points at which the air should come in and go out, and the necessity of a uniform temperature from floor to ceiling that would make everybody feel as comfortable in January as in June.

These investigations, although they have not led to the use of any well defined or specific system of car ventilation, were no doubt very "profitable," as they were often said to be at the close of each meeting. They placed the car-builders in possession of about all that it was important for them to know on the subject, and enabled them to form an intelligent judgment of what was needed to satisfy reasonable people, and also where it was necessary to stop in trying to humor the whims of a class of fussy and fanatical people who fancy they are inhaling disease and death with every breath they draw in a comfortably warmed and fairly ventilated railway car. It is an axiom that laws cannot be enforced in the face of a hostile public sentiment, and it is equally true that ventilating appliances for cars are of use only so far as they can be made to serve the comfort and convenience of passengers. The methods now in use are, as a rule, simple and effective. Passengers can regulate the incoming and outgoing currents to suit themselves, although there are individual tastes that are exceptional.

It is hardly probable that this threadbare topic will ever be discussed again to the extent that it was five or six years ago. Other problems of equal importance claim attention, and among these is the lighting of cars, which, with a few noted exceptions, is no better than it was twenty years ago. People will continue to complain of too much or too little ventilation according to their physical condition and temperaments, but it is a rare thing for anybody to complain of too much light in cars that run in the night-time. The universal complaint is that there is not light enough.

ECONOMY IN LOCOMOTIVE PERFORMANCE.

The *Railway Review* of Dec. 2, has an article on locomotive performance in which the writer seems to be apprehensive that some improvements may be made in the construction of locomotives that will result in a less consumption of fuel and steam, without reference to the effect of such reduction upon other items of expense, and that there is danger that "the same mistake will be repeated that has been made in stationary, pumping and marine engines."

It is safe to predict that if any changes are made that involve an increase in other expenses that will more than offset the economy in fuel, such changes will be short lived. As for the alleged "mistakes" in stationary engine improvements, we are at a loss to understand what they are. Among other improvements upon the ordinary throttling engine, we may cite the "Buckeye," "Porter-Allen" and "Corliss" automatics. If mistakes have been made in these they are certainly not very serious ones, or these engines would not be so extensively used, and used too on account of the cheapness of the power they supply as compared with the unimproved throttle engines. The economical improvements in marine compound engines have rendered new steamship lines possible, as well as an increase in ocean freight transportation that scarcely anybody dreamed of while the old type of engines were in use. Webb's compound locomotive has proved so successful that a large number are to be built, and Mr Stevens' riding-valve engine has justified the Central Pacific road in building 25 more of them, and each and all of these engines have been designed with a view to greater economy in operation. Watt was convinced that his condensing engine was the acme of perfection, and that any attempt to improve it was worse than useless. Many railway master mechanics, as well as the writer in the *Review*, entertain the same belief as regards the present locomotive engine, but the developments of a few years will be very likely to show that they are as much mistaken as Watt was.

NATIONAL EXPOSITION OF RAILWAY APPLIANCES.

The circular we print in another column, with the influential names appended to it, indicates that the project of a national exposition of railway appliances is to be carried into effect in a very short time. The exposition is to be held in Chicago, beginning May 31, and ending early in July.

Although a display of this kind has often been suggested, the matter has now for the first time taken definite shape. There can hardly be a doubt that the undertaking will be a great success. The number of devices included in the category of railway appliances is almost beyond computation, and the interests of inventors, manufacturers, dealers and users, stimulated by rivalry and favorable rates of transportation, can hardly fail to make the exhibit a very extensive one. The success of the exhibition, however, will not be estimated solely by its magnitude, or by the variety of appliances as indicating the inventive fertility of our population, but rather by the practical benefits to be derived from it by railroads. It will necessarily be a very different thing from an agricultural fair or a prize baby show. The attraction will not be from mere curiosity or diversion. Railroad men will go to learn something that they can turn to account, and to this class of visitors the most interesting feature of the exhibition will be "the scientific and practical tests by well-known scientists and carefully-selected committees," of every article and description of material that is capable of being tested. If this part of the programme is judiciously carried out without partiality or favoritism, it will go far towards settling a good many mechanical problems that must needs be settled before the desired reforms in railway operation can be realized. The success of the plan will, in our judgment, depend very largely upon the way in which these tests are managed and the official record that is made of them. As for prizes and medals, we think it would be wise to withhold all such tokens of merit. The public is already too familiar with these awards to attach any particular importance to them. There is a tremendous crop of them every autumn, and the effect of such baubles upon railway managers is not likely to be very stunning.

As the proposed exposition will be open during the month of June, the selection of Chicago by the Car-Builders' Association for this year's annual meeting was a good one.

THE CAR-COUPLING PROBLEM.

The more urgent the necessity for a standard car-coupling device, and the greater the number of such devices, the more difficult it is to make a choice. The embarassment arises from the superabundance of existing inventions, reinforced, as they are pretty sure to be, by a goodly number of new ones as soon as another year's crop is harvested. In the face of this unwieldy and ever increasing excess, the committee of the Car-Builders' Association, to which the subject had been referred, lost no time after the reorganization at Niagara, in transferring the weight of responsibility from its own shoulders to the newly created Executive Committee, by designating five of these devices by name as having special merit, and as being worthy of a trial. Three more are also mentioned in the report, but in a kind of secondary way which gives priority of merit to the five. As an initiatory step this will do very well. We can not make out whether the committee was, or was not, discharged from further service. The record is somewhat confused on this point, but it is hardly to be expected that it will make another report next June. The matter is now in the hands of the Executive Committee, where it properly belongs. Whether its action be positive or negative, prompt or tardy, it will be awaited with a good deal of interest by railroad men, inventors, and the owners of patent rights.

As bearing upon this subject, it should be mentioned that another line of procedure has been suggested from an influential quarter, which may possibly tend to delay or prevent any early or decisive action by the committee. It is proposed to form a joint stock company to determine which of the many coupling appliances are the best, then acquire the ownership of the same by buying up the patents, and lastly, force their introduction on the roads by the persuasive instrumentalities of power and influence. This plan, it must be confessed, is a very effective one, abstractly considered, and aside from any possibilities of corrupt self-seeking. But as a practical scheme, the idea of a joint stock company, with an unlimited nominal capital, its success depending on its ability to corner the coupling market, tamper with legislators, and hold prospective laws *in terrorem* over railway companies, is not calculated to inspire confidence. It would no doubt be a good thing for the owners of the patents that the corporation might propose to buy, also a good thing for the stockholders in such corporation, and it might prove to be a benefit to the railroads, but of that we are not so sure. Very likely the suggestion is merely designed to stir up the roads to do something through the agency of the Car-Builders' Association before the joint stock company gets under way, and so escape the threatened alternative of being forced to pay tribute to a pool of speculators.

On another page will be found the proceedings of a meeting of the representatives of street railway companies recently held in Boston for the purpose of forming a national association. A large number of delegates were present, and letters were read from many who could not attend, expressing cordial coöperation in the movement. An association was organized and a constitution and by-laws adopted with little or no conflict of opinion as to details or the objects to be attained. The growth of this class of railways during the past few years has been remarkable, and nowhere are they more indispensable or more thoroughly appreciated as a means of local transit

than in the city and suburbs of Boston, the car equipment of the various lines being unsurpassed in its completeness and beauty of construction. A more fitting point in this respect could hardly have been selected for giving the new association an auspicious start.

The objects to be attained are similar to those of other associations of this kind. The general interests of the companies will be discussed at the meetings, and especially with reference to improvements and economy in operation, and an increase of accomodations to the public. In these respects the machinery of an association, with its committees and specially designated subjects for inquiry and investigation, is far more effective than independent individual action. In their associate capacity, the street railway men will have no such perplexing problems to deal with as the interchange of cars, and the establishment of standards of uniformity in the matter of brakes, drawbars and couplings. There is one thing, however, that will force itself upon their attention, and that is the practicability of some kind of motor for street railways to take the place of horses. The cable system is at present in its experimental stage, and the prospect of its general adoption is not flattering, nor are surface roads likely to be superseded to any considerable extent by elevated roads, however indispensable the latter may be in a city like New York.

THOSE of our readers who are interested in the problem of a standard freight truck, will not fail to notice a communication on another page in reference to the testing of arch-bars. The writer is an experienced car-builder who has long been in charge of an important road shop, and the distinction he makes between shop tests and practical running tests will strike most railroad men as not only plausible, but obvious. We also give an illustration of a test of an iron truck belonging to the Cincinnati, New Orleans & Texas Pacific road.

Is this Stewart's Crossing?

A slightly deaf and somewhat fussy old lady of Macon, Ga., who had just married her third husband, started to visit some of his relatives at Americus, a town in one of the lower counties. As these relatives were not altogether pleased with the match, she arrayed herself in the most presentable style in order to make a favorable impression. As soon as she was fairly on the train she requested the conductor to let her know when the train reached Stewart's Crossing, which is about four miles from Americus. This, the conductor, of course, promised to do. Powersville was reached, the fourth station from Macon, when she called the conductor to her and eagerly inquired if that was Stewart's Crossing. He replied that it was not, and told her to give herself no anxiety, as he would tell her when they got there in fact, as it was not a regular station, he would give her notice before reaching it, so she could be in readiness. The train proceeded on its way, stopping at Fort Valley, Marshallville, Montezuma, Oglethorp and Andersonville, the old lady inquiring at every stop, and with increasing excitement and uneasiness, if that was Stewart's Crossing. The conductor's patience was sorely tried. He again and again informed her in the most positive manner that he would let her know when they got there. Shortly after leaving Andersonville, however, he got into a discussion with a gentleman on the comparative merits of broad and narrow gauge, forgetting for the time being everything else. Looking out of the window, he seized the bell-cord, exclaiming, "Bless me, we've passed Stewart's at least a mile."

Stopping the train, he had the motion reversed, and ran over a mile back to Stewart's Crossing when he went to the old lady.

"Stewart's Crossing, ma'am."

"Are we there?" she asked.

"Yes ma'am, hurry up and get off as soon as possible; we are behind time and had to run back nearly two miles for you."

The old lady seemed wondrously calmed, and said with the greatest simplicity:

"I don't want to get off here. I want to go to Americus."

"Don't want to get off here?" thundered the conductor, "what in the thunder did you want us to stop here for?"

"I didn't want you to stop here," she meekly replied.

"What did you want to know when we got here for then?"

"Because," smilingly said the venerable girl, "my old man told me when I got to Stewart's Crossing *it would be time to put in my teeth!*"

THE assets and property, real and personal, of the Cleveland Bridge and Car Works, will be sold at public auction, in Cleveland, O., on Wednesday, January 17, 1883. The sale will include buildings and fixtures, machinery, tools, material used in car and bridge construction, etc.

Sixteenth Annual report of the Master Car-Builders' Association.—The regular report of the proceedings at the June meeting at Philadelphia has been published in the usual form, and contains the reports of committees, discussions, rules governing the interchange of freight cars, illustrations of standard buffer blocks, wheel gauge, etc. As most of the matter contained in the report has already been published in our columns, a more extended notice is not necessary. The proceedings of the special meeting held at Niagara in October, and which are of much greater relative importance, will doubtless be published in a similar form in due time.

The Decorator and Furnisher is the name of a new monthly publication recently started in New York. Its purpose is to furnish information in reference to the fitting up and decoration of houses; and, judging from the contents of the third number, it should more than satisfy the most critical and exacting as to the quality of a publication of this kind. It is appropriately and superbly illustrated, and the letter press is faultless. The engravings are numerous, and are fully up to the standard of those in our best illustrated monthlies. Such a publication will do much to quicken the growing appreciation of whatever is artistic and beautiful in cabinet work and other features of house decoration, and no other than a first-class one is adequate to meet the existing demand for ideas and suggestions on the subject. This publication, if well sustained by its publishers and patrons, as we have no doubt it will be, can hardly fail to be widely appreciated as a gem in our shining galaxy of illustrated periodicals. The yearly issues will deserve to be handsomely bound and placed on the center-table of every well ordered parlor and drawing-room in the land. Published by E. W. Bullinger, 75 Fulton street, New York. A. Curtis Bond, Editor. Subscription price $4 a year. Single numbers 35 cents.

The Builders' Guide and Estimators' Price Book.—This little volume contains a great deal of information of the kind indicated by its title, consisting of approximate prices of material and labor in the construction of buildings, a large number of rules, memoranda, tables and receipes, of great practical value to builders and of easy reference, to which is attached a comprehensive glossary of architectural and building terms. The book contains 330 pages, is well printed, and will be of great service to contractors, real estate owners and insurance valuators. By F. T. Hodgson, Editor of "*The Builder and Woodworker.*" Published by The Industrial Publication Co., New York.

The Tanite Co.'s works, at Stroudsburg, Pa., have just been enlarged by the addition of a new store-house, a new casting shed, and an extension to the boiler shed. A new horizontal boiler has also been put in, and a Worthington double acting steam pump. The fact that these improvements are in addition to other important ones made only a few months ago, is an evidence of the constantly increasing growth of the company's business.

GODDELL & WATERS, of Philadelphia, manufacturers of wood-working machinery, have reduced the price of the Amesbury Band-saw Filing Machine from $32 to $25, and the Amesbury Band-saw Setting Machine from $25 to $20.

Our Directory.

The lists have received a general revision since our November number was issued. Some of the changes noted below were received too late to have the corrections made in the Directory in present number:

Cincinnati, Hamilton & Dayton.—George S. Griscom, formerly of Pittsburgh, Fort Wayne and Chicago, has been appointed General Superintendent, with office at Cincinnati.

Grand Trunk.—J. D. McIlwain, General Foreman of Car Department of Great Western Division, has been appointed Assistant Mechanical Superintendent, and will have charge of repairs and inspection of cars in addition to his former duties.

Lehigh Valley.—H. Stanley Goodwin has been appointed Superintendent in place of Robert H. Sayre, resigned.

Louisville & Nashville.—P. P. Huston has been appointed Penchasing Agent vice G. C. Breed.

Midland of Canada.—J. Haggas is Mechanical Superintendent in place of W. Marling.

Minneapolis & St. Louis.—George F. Wilson has been appointed Master Mechanic in charge of locomotive and car departments, in place of H. A. Towne, resigned.

Mexican National.—John Scullen has been apointed General Manager of Southern General Division, with offices at No. 11 Calle Cadena, City of Mexico.

New York City & Northern.—Theodore Wheeler has been appointed Master Mechanic, in place of M. McNally, resigned.

New York, West Shore & Buffalo.—P. S. Bemis, Purchasing Agent of the North River Construction Co., also acts in same capacity for this road.

New York & New England.—Ross Kells, recently on the New York, Chicago & St. Louis, has been appointed Superintendent of Motive Power.

Ohio & Mississippi.—The address of J. H. Setchel, General Master Mechanic, is Vincennes, Ind.

Sabine & East Texas.—A. T. Smith is appointed Superintendent in place of John B. Morford, resigned.

Union Pacific.—M. H. Goble, late Freight Auditor, has been appointed Purchasing Agent in place of A. D. Clark, resigned.

The Century.—A little more than a year ago this magazine passed a critical point in its history. Three important things happened to it: a change in its ownership, a change in the name of the corporation publishing it, and the death of the editor-in-chief, Dr. J. G. Holland. Probably no such combination of circumstances had ever come to any periodical, and people watched with no little interest to see what would be the result. The change in name began with the Nov. (1881), number, and the death of Dr. Holland came just before its issue. By reason of the great excellence of this number and its broad popular features, its sale reached 137,500 copies—the average edition during the preceding twelve months having been 120,000. The following number, December, was a memorial issue to President Garfield and Dr. Holland; its sale was almost as great, and the increased demand has largely continued through the year. The November number (1882) just issued, has an edition of 140,000 copies. The reasons of this growth are various: but they may be, for the most part, ascribed to the fact that the resources of literature and art have been constantly augmenting, and that a gradual improvement has been going on, which has resulted in the issue of what the *Providence Journal*, speaking of *The Century Magazine*, calls "the most able and valuable publication ever put forth in magazine form." Among its special features for 1883, "The History of Life in the Thirteen Colonies," a series of separate papers by Dr. Edward Eggleston, just begun, to be richly and accurately illustrated, is alone worth the subscription price. Washington Gladden's realistic serial, entitled "The Christian League of Connecticut," is attracting wide attention among business men interested in Christian work. Henry James, Jr., Alphonse Daudet, Mrs. Frances Hodgson Burnett, Charles Dudley Warner, "H. H.," George W. Cable, E. V. Smalley, Thomas Hughes, Edmund W. Gosse, John Burroughs, H. H. Boyesen, Professor Lounsbury, Joel Chandler Harris ("Uncle Remus"), T. W. Higginson and Frank R. Stockton, are among the contributors, and from them and other distinguished writers will come the material for another brilliant year of *The Century*. Mr. W. D. Howell's new novel, "A Woman's Reason," begins in the February number. The *N. Y. Nation* pronounces *The Century* "perhaps the most judiciously edited magazine in the world."

St. Nicholas.—This is another magazine published by the Century Co. In the field of children's literature it occupies the same place that the Century fills in the grown up world. It is just now beginning its tenth year, and is a magazine of which the *London Times* said a year ago: "It is above anything see produce in the same line." It is a theory of the editor, Mrs. Mary Mapes Dodge, that there is nothing too good for children, and the boys and girls who read St. Nicholas are really getting the very best writing and the finest pictures that can be had. Its circulation is world-wide. In England, where it has had a large monthly sale for several years, six copies are said to be taken in the household of the Prince of Wales. The Queen of Italy reads it every month to her children. A book was recently issued in the Arabic language, and printed at Beirut, Syria, made up of poems and stories translated from St. Nicholas, enriched with the original pictures loaned by the publishers for that purpose. This year the magazine is to have a serial story by J. T. Trowbridge, one of the most popular writers for boys in the world, and another by Frank R. Stockton—a historical novelette of boy and girl life in the thirteenth century—which the *Springfield Republican* has already predicted "will prove easily the best story of the year for the young." St. Nicholas contains eighty or more pages every month, with from fifty to a hundred pictures. The Century costs $4 a year and St. Nicholas $3, both published by the Century Co., New York, N. Y.

Employment.

Advertisements will be inserted under this heading for one dollar for each insertion.

WANTED.—A situation as General Foreman of a car works Blacksmith and Hammer Shop, by a person who has had 15 years' experience in such capacity, and is thoroughly familiar with car and locomotive work and railroad forgings. Can furnish most satisfactory references. Address NATIONAL CAR-BUILDER, Morse Building, New York.

WANTED.—By a first-class Stenographer and type-writer, who also understands book-keeping, a position as stenographer to a railroad official in New York City. Has been stenographer to a railroad president, and lately with a superintendent of construction. Address "STENOGRAPHER," office of NATIONAL CAR-BUILDER, Morse Building, New York.

WANTED.—A position in the Mechanical Department of a Railroad by a person who has had over twenty years' experience as Master Mechanic on one road. Can furnish the best of reference. Address NATIONAL CAR-BUILDER, Morse Building, New York. 2t

WANTED.—A permanent position by a first-class Draughtsman who is thoroughly acquainted with the construction of Locomotives, other Railway Rolling Stock, and all kinds of Machinery. Has experience and can furnish good recommendations. Address "E. O. H.," NATIONAL CAR-BUILDER, 144 N. Clark Street, Chicago, Ill.

WANTED.—An article to be sold to railroads (through the car-builders and master mechanics). If the article has merit will guarantee success by a party of large and favorable acquaintances. Address "PUSH," NATIONAL CAR-BUILDER, Morse Building, New York.

WANTED.—A position by a young man, to represent in Boston, some company or house, dealing in Railroad Supplies, or specialities. Has had experience, and is well acquainted with New England roads. Best of references given. Address, F. P. B., 42 Water street, Boston.

NOTICE OF PUBLIC SALE.

NOTICE IS HEREBY GIVEN THAT THE UNDERsigned, William H. McCurdy, assignee, and Luther Allen, trustee of the Cleveland Bridge and Car Works, will sell at public auction, at the office of the works, on Wason street, near Lake street, in the city of Cleveland, County of Cuyahoga and State of Ohio, on Wednesday, the 17th day of January, 1883, at 11 o'clock A. M., the entire assets and property of the Cleveland Bridge and Car Works, both real and personal (excepting the book accounts, bills, notes and other choses in action).

The said real estate to be sold is described as follows:

Parcel No. 1, situate in the city of Cleveland, County of Cuyahoga and State of Ohio, and bounded and described as follows: Beginning at the intersection of the east line of Wason street with the north line of Hamilton street; thence east along the north line of Hamilton street, twenty rods; thence northerly at right angles with Hamilton street 247 6-12 feet to the south line of Dart street; thence west along the south line of Dart street 20 rods to the east line of Wason street; thence southerly along the east line of Wason street 247 6-12 feet to the place of beginning. Also sub-lots 135, 136, 137, 143, 144 and 145 in L. Case's allotment of ten-acre lots Nos. 146 to 153 inclusive, in said city of Cleveland, as shown by recorded plat, and being 148 5-12 feet front on the north line of Hamilton street, and extending between parallel lines 247 6-12 feet to the south line of Dart street, and situate next east of said last-described land.

The buildings and fixtures on the above-described parcel are as follows:

Buildings adjoining (containing machine shop, carpenter shop, erecting shop, engine room and pattern room), passenger car and woodworking shop, with engine house attached, paint shop, boiler house, paint storage house and reservoir combined, lumber dry-house, lumber dryer, together with lumber sheds, store rooms, railway tracks, transfer tables, platforms and their fixtures, coal holders, engines, boilers, main lines of shating, etc.

Parcel No. 2, situate in the city of Cleveland, as aforesaid, and bounded and described as follows: Sub-lots Nos. 138 to 142 inclusive, of L. Case's allotment of ten-acre lots Nos. 146 to 153 inclusive, as aforesaid, and being 247 6-12 feet front on the west line of Case avenue (extending from north line of Hamilton street to south line of Dart street), and being 165 feet deep, to an alley 16½ feet wide. This parcel is used as a lumber yard, and has no building upon it, but is provided with about 165 feet of railway track.

Parcel No. 3, situate in the city of Cleveland, as aforesaid, and bounded and described as follows: Sub-lots Nos. 154 to 158 inclusive, in L. Case's allotment of ten-acre lots Nos. 146 to 153 inclusive, as aforesaid, and being 200 feet front on the south line of Lake street, and extending back between parallel lines 129 6-12 feet to the north line of Dart street.

The buildings on this parcel consist of blacksmith shops, containing engine and boiler room, and hammer shop, together with engines, boilers, main lines of shafting, etc.

Parcel No. 4 consists of a frame building and its fixtures, used as a riveting shop, and also the easterly ends of the blacksmith and hammer shops (described in parcel number three), situated on sub-lot No. 153, in L. Case's allotment of ten-acre lots Nos. 146 to 153 inclusive, as aforesaid, and also a frame building and its fixtures, used as a machine shop, situated on sub-lot No. 159 of the same allotment, said sub-lots Nos. 153 and 159 being leased to the Cleveland Bridge and Car Works, which said lease expires Feb. 1, 1883.

Parcel No. 5, situate in the city of Cleveland, as aforesaid, and bounded and described as follows: Sub-lots Nos. 171 to 180 inclusive, of L. Case's allotment of ten-acre lots Nos. 146 to 153 inclusive, as aforesaid, and being 400 feet front on the south line of Lake street, and extending back between parallel lines 120 feet to lands owned by the Cleveland & Pittsburgh railroad Company. This parcel is occupied as a lumber yard, and has about 400 feet of railway track, a small tool-house and part of a barn upon it.

The personal property which will be offered for sale consists of a complete set of machines, tools, shafting, hangers, pulleys, belts, etc., used for the manufacture of railroad cars, street cars, etc., bridges, roofs, architectural iron works and similar structures.

Material on hand, suitable and designed for the manufacture of the articles and structures above named, and consisting of:

Lumber, principally oak and pine, about	1,735,000 feet.
Bar iron, about	216 tons.
Shaped iron (beams, channels, angles, plates, tees, etc.), about	97 tons.
Pig iron, about	246 tons.

And other materials, such as bolts, nuts, washers, screws, sheet iron, spring steel, etc.

The above described personal property is nearly all situated on the premises in Cleveland, and can be inspected by intending purchasers.

The entire assets, excepting the bills, notes, book accounts and other choses in action will be sold as a whole.

The above property will be sold free of incumbrance and for cash.

Printed schedules of the assets, tobether with map of the real estate, will be furnished upon application at our office.

WILLIAM H. McCURDY, Assignee.
LUTHER ALLEN, Trustee.

CLARENCE BROOKS & CO.

MANUFACTURERS OF

RAILWAY CAR AND FINE COACH VARNISHES.

Cor. West and West 12th sts., New York.

JOHN W. MASURY & SON,

MAKERS OF STRICTLY FIRST-CLASS

Railway Varnishes,

AND MANUFACTURERS OF

CAR BODY COLORS.

By permission, we refer to the following Companies, for whom we have made Special Colors:

PENNSYLVANIA RAILROAD CO., Enoch Lewis, Purchasing Agent, Philadelphia, Pa.
PENNSYLVANIA CO., Wm. Mullins, General Purchasing Agent, Pittsburg, Pa.
BALTIMORE & OHIO RAILROAD CO., N. S. Hill, Purchasing Agent, Baltimore Md.
CHICAGO & ALTON RAILROAD CO., A. V. Hartwell, Purchasing Agent, Chicago, Ill.
CHICAGO & NORTHWESTERN RAILROAD CO., R. W. Hamer, Purchasing Agent, Chicago, Ill.
LEHIGH VALLEY RAILROAD CO., L. Chamberlin, Purchasing Agent, Philadelphia, Pa.
NORTHERN RAILROAD OF CANADA, F. W. Cumberland, Superintendent, Toronto, Ont.
NAUGATUCK RAILROAD CO., G. W. Beach, Superintendent, Waterbury, Conn.
PHILADELPHIA, WILMINGTON & BALTIMORE RAILROAD CO., S. A. Hodgman, Superintendent of Motive Power, Wilmington, Del.
NEW YORK, NEW HAVEN & HARTFORD RAILROAD CO., R. N Dowd, Commissary, New Haven, Conn.
UNION PACIFIC RAILROAD CO., KANSAS — A. D. Clark, Purchasing Agent, Omaha, Neb.
CHICAGO, BURLINGTON & QUINCY RAILROAD CO., Wm. Irving, Purchasing Agent Chicago, Ill.
LOUISVILLE, CINCINNATI & LEXINGTON RAILROAD CO., Wm. Mahl, Purchasing Agent, Louisville, Ky
GRAND TRUNK RAILWAY N. Wall, Port Huron, Mich.
LITTLE ROCK & FORT SMITH RAILROAD CO., T. Hartman, Purchasing Agent, Little Rock, Ark.
GILBERT & BUSH CO., Troy, N. Y.
WASON MANUFACTURING CO., Brightwood, Mass.
BILLMEYER & SMALL MANUFACTURING CO., York, Pa. — Railroad Car Builders.
JACKSON & SHARP CO., Wilminton, Del.
BARNEY & SMITH MANUFACTURING CO., Dayton, O.

The advantages derived from the use of such Special Colors are many, a few of which are found below: **SAVING OF MONEY,** because of small quantity required. **SAVING OF TIME, ABSOLUTE UNIFORMITY OF SHADE, DURABILITY,** as we use perfectly pure materials. **LARGER DEGREE OF CERTAINTY SAVING OF LABOR AND MATERIAL,** as no extra amount of Varnish will be required to hide a sanded surface in the putting on of the same.

We make any desired shade, it only being necessary that purchasers furnish us with sample of color desired, stating the time they would like to have the paint dry in.

We shall be glad to furnish samples and give prices to any who may wish to avail themselves of the above advantages.

Very respectfully

JOHN W. MASURY & SON, New York and Chicago.

Established 1856.

Shipman & Bolen, Manufacturers of fine Railway Varnishes,

No. 352 Mulberry St., Newark, New Jersey.

BILLINGS, TAYLOR & CO.,

Color Makers,

AND MANUFACTURERS OF

VARNISHES, JAPANS AND LIQUID OIL DRYERS,

CLEVELAND, OHIO.

JAMES T. PATTEN,

RAILWAY EQUIPMENT.

REPRESENTING THE

Wason Mfg. Co., of Springfield, Mass. RAILWAY CARS, ETC.

Portland Company, of Portland, Me. LOCOMOTIVES.

162 BROADWAY, - - - - NEW YORK.

THOS. R. SHARP,

CONSULTING AND INSPECTING ENGINEER,

115 BROADWAY, NEW YORK.

SPECIAL ATTENTION GIVEN TO THE

Examination of Railroad Properties and Accounts, detailed Reports prepared of their condition and future prospects,

And to the Preparation of Railroad Prospectuses, Maps, Plans and Estimates of Cost of Construction.

ALSO TO THE

Construction of Railroads, the Purchase, Sale and Inspection of R. R. Material and Equipment.

Information promptly furnished on any and all subjects appertaining to the Organization, Construction Equipment and Operation of Railroads.

REFERENCES:

Hon. J. W. Gilbert, Brooklyn, N. Y.
Hon. H. J. Jewett, Pres. N. Y., L. E. & W. R. R., N. Y.
H. W. Ford, Pres. Nat'l Bank of Republic, N. Y.
R. T. Wilson & Co., Bankers, N. Y.
J. M. Crane, Cashier Nat'l Shoe & Leather Bank, N. Y.
Gwens & Mercer, Bankers, N. Y.
W. B. Dinsmore, Pres't Adams Express Co., N. Y.
H. B. Plant, Pres't Savannah, Florida & Western R. R., and Southern Express Co., N. Y.
Gen. Thos T. Eckert, V. Pres't W. U. Tel. Co., N. Y.
J. H. Devereux, Pres't C., Cin. C. & I. R. R., Cleveland.
John Newell, Gen'l Manager Lake Shore & M. S. R. R., Cleveland, O.
J. M. Toucey, Gen'l Sup't N. Y. C. & H. R. R. R., N. Y.
G. B. Roberts, Pres't Pennsylvan a R. R., Phila., Pa.
A. J. Cassatt, Vice-Pres't, " "
Frank Thompson, Gen. Man.'r " "
Thomas Cochran, Pres't Guarantee Trust and Safe Deposit Co., Philadelphia, Pa.
Robert Garrett, V. Pres't B. & O. R. R. Co., Baltimore.
John M. Robinson, Pres't Bay Line, Baltimore, Md.
Hon. John C. New, A. Sec'y Treasury, Washington.
James McCrea, Man. P. C. & St. L. Ry., Columbus.
W. C. Quincy, Gen'l Man., P. & L. E. R. R., Pittsburgh.
W. W. Peabody, Sup't O. & M. R. R., Cincinnati.

BOULTON CARBONS

FOR

ELECTRIC LAMPS.

Room 7, 125 Dearborn Street, Chicago.

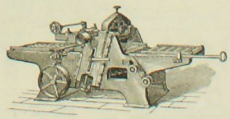
C. S. CLEAVER, - - - - - - - General Agent.

J. A. FAY & CO.,

BUILDERS OF

WOOD WORKING MACHINERY,

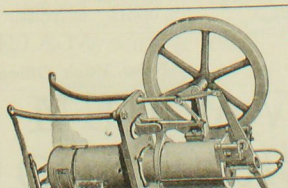
FOR RAILROAD & CAR SHOPS, NAVY YARDS AND ARSENALS, BRIDGE SHOPS, ETC.



FOR CAR SILL DRESSING, PLANING AND MATCHING, CAR GAINING, CAR TENONING, MOLDING, SHAPING, MORTISING, BORING, ETC., ETC., ETC.

W. H. DOANE, Pres.
D. L. LYON, Sec'y.

CINCINNATI, OHIO, U. S. A.



Delamater Iron Works,

C. H. DELAMATER & CO.,

PROPRIETORS.

Warerooms No. 10 Cortlandt St., New York City.

ERICSSON'S NEW CALORIC PUMPING ENGINE.

For Tank Pumping for Houses and Country Seats, Hotels, &c., in City and Country.

OVER 4,000 IN USE.

Send for circular.

J. NOYES SMITH & CO.,

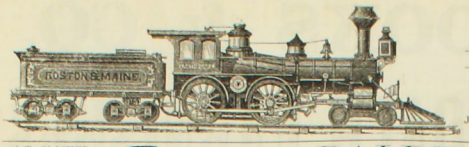
BUILDERS OF

NUT, BOLT AND WASHER MACHINERY,

AND MANUFACTURERS OF

NUTS, BOLTS, WASHERS, PLOW BOLTS, Etc.

59 & 61 S. WATER ST., CLEVELAND, O.



MANCHESTER LOCOMOTIVE WORKS,

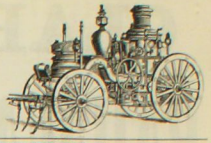
MANUFACTURERS OF

LOCOMOTIVES,

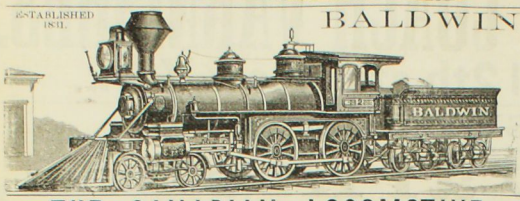
AND THE

AMOSKEAG STEAM FIRE-ENGINE.

JOHN A. BURNHAM, President. WM. G. MEANS, Treas., Boston, Mass.
ARETAS BLOOD, Agent, Manchester, N. H.



ESTABLISHED 1831.



BALDWIN LOCOMOTIVE WORKS,

PHILADELPHIA, PA.

BURNHAM, PARRY, WILLIAMS & CO., PROPRIETORS,

GEO. BURNHAM, CHAS. T. PARRY, EDWARD H. WILLIAMS, } MANUFACTURERS OF { WM. P. HENSZEY, EDW. LONGSTRETH, JOHN H. CONVERSE.

LOCOMOTIVE ENGINES, { CAPACITY 600.

Adapted to every variety of service, and built accurately to standard gauges and templates. Like parts of different engines of same class perfectly interchangeable.

Passenger and Freight Locomotives, Mine Locomotives, Narrow Gauge Locomotives, Steam Street Cars, etc. Illustrated Catalogues furnished on application of customers. All work thoroughly guaranteed.

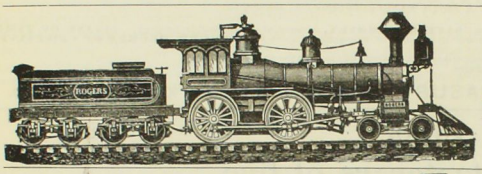
THE CANADIAN LOCOMOTIVE AND ENGINE COMPANY, LIMITED,

KINGSTON, ONTARIO, CANADA.

MANUFACTURERS OF LOCOMOTIVE ENGINES ADAPTED FOR EVERY CLASS OF RAILWAY SERVICE.

All parts built to gauges and templates, and all like parts warranted interchangeable on engines of the same class. SPECIFICATIONS FURNISHED UPON APPLICATION

WM. HARTY, Managing Director. JAS. W. PYKE, Secy. and Treasurer.



ROGERS LOCOMOTIVE AND MACHINE WORKS,

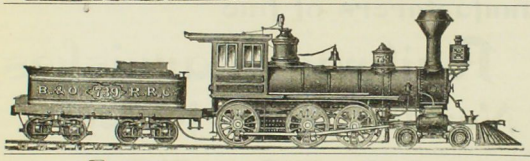
PATERSON, N. J.

New York Office, 44 Exchange Place.

Manufacturers of Locomotive Engines and Tenders and other Railroad Machinery.

J. S. ROGERS, President. R. S. HUGHES, Secretary. WM. S. HUDSON, Sup't. } PATERSON, N. J.

R. S. HUGHES, Treas., 44 Exchange Place, New York.



PITTSBURGH LOCOMOTIVE AND CAR WORKS.

PITTSBURGH, PA.,

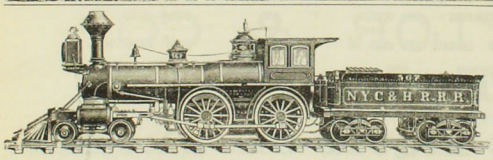
MANUFACTURERS OF

Locomotive Engines for Broad or Narrow Gauge Roads,

From standard designs, or according to specifications, to suit purchasers.

Tanks, Locomotive or Stationary Boilers Furnished at Short Notice

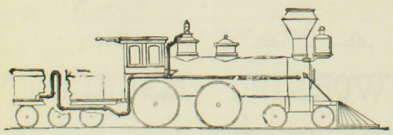
D. A. Stewart, Prest. D. A. Wightman, Supt. Wilson Miller, Sec. & Treas.



SCHENECTADY LOCOMOTIVE WORKS.

CHAS. G. ELLIS, President. EDWARD ELLIS, Treasurer.
WALTER McQUEEN, Vice-President.

SCHENECTADY, N. Y.



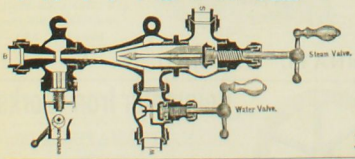
THE ASHTON VALVE COMPANY,

271 Franklin Street, Boston, Mass.

The Ashton Blow-back Safety-valve is constructed so as to conduct the escape steam which is blown off back to the feader, or to the smoke-box and up the chimney. By this arrangement the heat of the escape steam, instead of being wasted as it is when an ordinary safety-valve blows off, is communicated to the cold water in the tender. This not only results in an important economy, but it renders the escaping steam noiseless, and the increase of temperature of the water has a tendency to deposit some of its impurities before it is pumped into the boiler. It thus *stops the water's waves fuel! and all engines steam better and faster, and do more effective work with these valves* than with those in ordinary use.

NATIONAL TUBE WORKS COMPANY,

BOSTON, MASS., and McKEESPORT, PENN.



TRADE LOCOMOTIVE MARK.

Wrought-Iron Pipe and Tubes all sizes.

Special Semi-Steel Tubes for Locomotives, Extra Heavy and Double Durability.

MACK'S PATENT INJECTOR.

New York Office, 104 John Street. Chicago Office, 159 Lake Street.

EAMES VACUUM BRAKE CO.

RAILWAY TRAIN BRAKES.

SALES OFFICE: 15 GOLD STREET, NEW YORK.
Represented by THOMAS PROSSER & SON.

THE EAMES BRAKE is confidently offered as the most efficient, simple, durable, and cheapest power Brake in the market. Can be seen in operation upon over eighty roads.

SHIFTING LOCOMOTIVE.

H. K. PORTER & CO.,

PITTSBURG, PA.

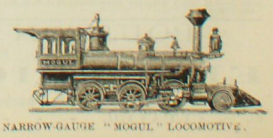
LOGGING LOCOMOTIVE

Builders of all Kinds of

LIGHT

Locomotives.

Send for Catalogue,



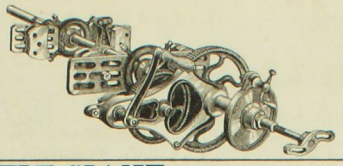
NARROW-GAUGE "MOGUL" LOCOMOTIVE.

PATENT IMPROVED LOCOMOTIVE CYLINDER BORING MACHINE

Bars Made Any Size Required for any kind of Work.

Special Lathe Bars made with Self Feed.

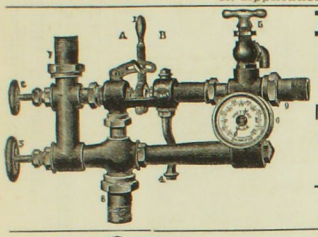
New Descriptive Catalogue on Application.



L. B. FLANDERS MACHINE WORKS

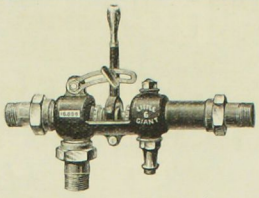
PEDRICK & AYER, PROPRIETORS.

1025 HAMILTON ST., PHILADELPHIA.



LITTLE GIANT BOILER Testing Apparatus.

To Test Boilers with Warm Water.



Send for circulars and full particulars.

Rue's Little Giant Injector.

GREATLY IMPROVED.

Adapted to every variety of service. Thoroughly interchangeable. Fully guaranteed.

SPECIAL INJECTOR FOR WASHING OUT BOILERS.

10,850 now in use by over 210 Railroads.

INJECTORS A SPECIALTY.

RUE MFG. CO.,

906 FILBERT STREET,

PHILADELPHIA, PA.

TRADE MARKS:

PHOSPHOR-BRONZE

FOR BEARINGS OF LOCOMOTIVES, CARS AND MACHINERY

SLIDE VALVES, CYLINDER RINGS AND STEAM CONNECTIONS.

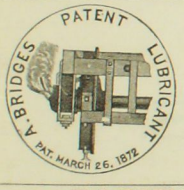
SAVES OIL AND REPAIRS, PREVENTS DELAY TO TRAINS, AND NEVER CUTS THE JOURNALS.

Pamphlets and particulars on application to

"Phosphor-Bronze." THE PHOSPHOR-BRONZE SMELTING CO., Limited,

Office, 512 Arch Street, Philadelphia, Pa.

Owners of the United States Phosphor-Bronze Patents. Sole Manufacturers of Phosphor-Bronze in the United States.



HOT JOURNALS ENTIRELY PREVENTED.

BRIDGES' LUBRICANT

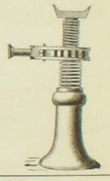
FOR RAILROAD CAR JOURNALS AND OTHER BEARINGS.

SAMPLES FURNISHED GRATIS. SEND FOR CIRCULAR.

Manufacture Ball's Telescopic Screw Jack.

JOHN S. URQUHART, Successor to

ALBERT BRIDGES 46 CORTLANDT STREET NEW YORK.



JAMES W. ROSS,

IMPORTER OF AND FURNACE AGENT FOR

SCOTCH and AMERICAN PIG IRON,

MANUFACTURERS' AGENT OF

Bar Iron, Car Wheels, Axles, Rails and Railroad Supplies.

SALES AGENT

WHITAKER IRON CO., of Wheeling, W. Va.

Manufacturers of Sheet-Iron, Tank, and Fire Bed.

36 Dearborn Street, - - - - CHICAGO.

A. A. THOMSON & CO.,

IMPORTERS AND DEALERS IN

RUSSIA SHEET IRON

For Locomotive Jackets and other Fine Work.

We sell the GENUINE imported article, which long experience has proved to be the most durable polished iron ever manufactured. It will not contract rust by mere exposure to the atmosphere.

Tin and Roofing Plates especially adapted for Railroad Car Roofs. Pig Tin, Zinc, Solder, Lead, Etc.

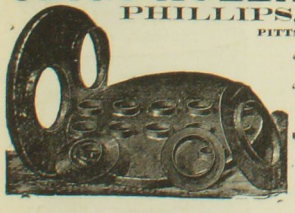
Nos. 213 and 215 WATER STREET, NEW YORK.

SLIGO ROLLING MILLS.

PHILLIPS, NIMICK & CO.,

PITTSBURGH, PA.,

MANUFACTURERS OF



"Sligo" Boiler Plate and Fire-Box Iron.

"Sligo" Bar, Band, Sheet and Angle Iron.

"Sligo" Stay Bolt Iron, Used by the Principal Railroads in the United States, and Warranted Unexcelled.

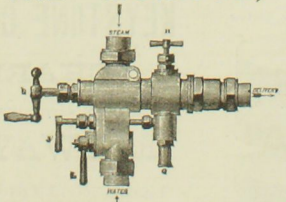
"TYRONE" BRAND BAR SHEET, TANK PLATE and ANGLE IRON.

Quality our Specialty.

BOILER HEADS AND FLUE HOLES FLANGED TO ORDER.

SEND FOR PRICE-LIST.

THE "MONITOR," FRIEDMANN'S PATENT



A NEW LIFTING INJECTOR FOR LOCOMOTIVES.

Send for Descriptive Circular.

Locomotive Injectors

LIFTING & NON-LIFTING

With all Latest Improvements.

EJECTORS, OILERS, LUBRICATORS, &c.

NATHAN & DREYFUS,

NEW YORK.

BLIND SHADE

Planing Machine FOR CAR WORK.

The most perfect Machine in use.

LEE'S PATENT

Molding Machines

Five different styles and sizes. These are especially adapted to all classes of car work.

HENRY A. LEE, Manuf'r, 164 Union St., Worcester Mass.

W. D. WOOD & CO.'S

PATENT PLANISHED SHEET IRON.

Patented March 14, 1865; April 8, 1873; Sept. 9, 1873; Oct. 6, 1874; Jan. 11, 1876.

Guaranteed fully equal, in all respects, to the

IMPORTED RUSSIA IRON,

And at a much less price.

LOCOMOTIVE JACKET IRON

Our Specialty.

For sale by all the principal Metal Dealers in the large cities throughout the United States, and at their office,

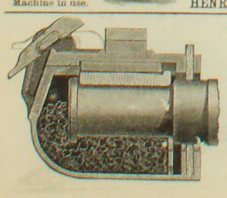
111 Water Street, Pittsburgh, Pa.

THIS HAMMER

AWARDED THE FIRST PREMIUM OF A SILVER MEDAL AT THE American Institute Fair, N. Y. CITY, NOV., 1873.

Superior in every point to any modification of the Trip Hammer. Simple, Powerful, Efficient and Cheap. Four sizes now being built. For Prices and Descriptive Circulars, address the manufacturers.

S. C. FORSAITH & CO., Manchester, N. H., who are also builders of the Abbe Bolt-Heading Machine.



THE HEWITT BOX-LID CO.,

142 DEARBORN ST.,

CHICAGO, ILL.

We respectfully refer you to the following railroads using the Hewitt Cover.

K. C., F. J. & C. R.; M. R., Ft. S. & G.; C., B. & Q.; C., A. & St. L.; , & K. F.; A. & N., K. P.; P. & P. M., D., L. & N.; D. & B. C.; M. C.; H. & St. J.; C. & V.; St. L., I. M. & S.; B. & M. R. (in Neb.); D. P.; L. L. & G.; L. E. & W.; L. F. & G.; I. C.; O. C.; St. L. V. & T. H.; St. P. & S. ; N. P.; C. & E. I.; M. P.

HOWARD IRON WORKS,

BUFFALO N. Y.,

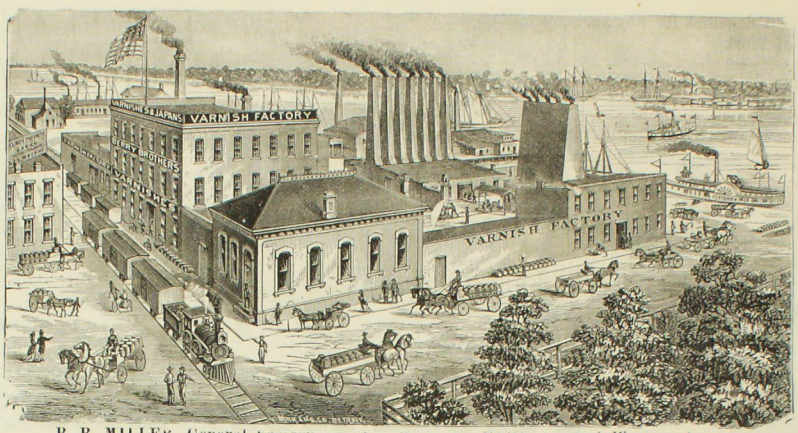
MANUFACTURERS OF

Schlenker's Automatic Revolving Die Bolt Cutter and Nut Tapping Machine.

SPECIALLY ADAPTED FOR RAILROAD WORK

BERRY BROTHERS, DETROIT, MICH., MANUFACTURERS OF RAILWAY VARNISHES.

ESTABLISHED IN 1858. USE BERRY BROTHERS' RAILWAY VARNISHES.



ESTABLISHED IN 1858. USE BERRY BROTHERS' RAILWAY VARNISHES.

B. R. MILLER, General Eastern Agent. D. L. EARL, General Western Agent.

THE E. D. ALBRO COMPANY,

DIRECT IMPORTERS OF

MAHOGANY

(Via New Orleans),

MANUFACTURED TO SIZES SPECIALLY ADAPTED FOR

CAR-BUILDERS.

MANUFACTURERS OF

VENEERS, CAR-BUILDERS' MATERIAL

FROM DOMESTIC AND FOREIGN WOODS.

685--711 West 6th St., **CINCINNATI, O.**

Estimates and Price Lists Furnished.

NO. 19.
Keystone Single Coil Bolster Spring

Patented Aug. 16th, 1881, and January 3d, 1882.
Capacity, 35,000 Pounds Each.
Motion Very Soft and Slow.

KEYSTONE CAR SPRING WORKS.

CHARLES SCOTT,

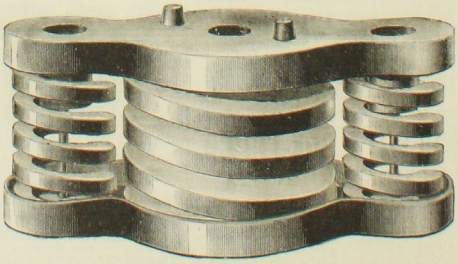
C. T. SCHOEN, Supt. MANUFACTURER OF

RAILWAY CAR SPRINGS,

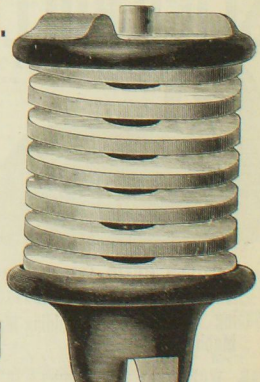
1,028 to 1,038 New Market Street,

PHILADELPHIA, PA.

KEYSTONE GRADUATED BOLSTER SPRING.
NO. 17.



Capacity 40,000 Pounds Each—Motion Softer than Elliptics.
Patented August 16th 1881 January 3d and March 21st 1882.



Patented January 3d, 1882.

DIRECTORY

of the Railroads of the United States and Canada, showing the gauge, length of road, number of locomotives and number of cars; and giving the names and titles of their principal officers in charge of the operating, purchasing and rolling stock departments.

A

Adirondack R. R. 4-8½ gauge 60 m. 3 lo. 62 cars.
C. E. Durkee, *Supt.* ..... Saratoga, N. Y.
Jacob Myers, *M. M.* ..... Saratoga, N. Y.
Jas. J. Traver, *M. C. B.* ..... Saratoga, N. Y.
Alabama Great So'n R. R. ..... (See Cin., N. O. & T. P.)
Albany & Susquehanna R. R. ..... (See D. & H. Canal Co.)
Albert Ry. 4-8½ g. 51 m. 3 lo. 32 cars.
G. A. Robinson, *Manager* ..... Hillsboro, N. B.
Jas. McKay, *M. M. & C. B.* ..... Hillsboro, N. B.
Allegany Central R. R. 3 gauge 30 miles.
Geo. D. Chapman, *Gen. Man.* ..... Angelica, N. Y.
W. O. Chapman, *Gen. Supt.* ..... Friendship, N. Y.
Allegheny Valley R. R. 4-9 g. 259 m. 70 lo. 2200 c.
David McCargo, *Gen. Supt. & Pur. Agt.* ; and
C. B. Pirtce, *Supt.* (Riv. Div.) ..... Pittsburg, Pa.
A. A. Jackson, *Supt.* (L. G. Div.) ..... Reynoldsville, Pa.
Geo. W. Glass, *M. M.* ..... Verona, Pa.
R. Gunning, *M. C. B.* ..... Verona, Pa.
Annapolis & Elk Ridge R. R. 4-8½ g. 20 m. 4 lo. 29 c.
W. H. Bians, *Supt. & Pur. Agt.* ..... Annapolis, Md.
John L. Beall, *M. Mech.* ..... Annapolis, Md.
Arkansas Midland R. R. 3-6 g. 48 m. 4 lo. 45 cars.
H. E. Johnson, *Pr. & Gen. Man.* ..... Helena, Ark.
J. B. Johnson, *M. M. & M. C. B.* ..... Helena, Ark.
Ashland Coal & Iron Ry. 4-8½ g. 30 m. 7 lo. 425 c
Douglas Putnam, *Jr., Gen. Supt.* ..... Ironton, Ky.
Robt. Peebles, *Pur. Agt.* ..... Ashland, Ky.
E. M. Roberts, *M. M.* ..... Ashland, Ky.
Ashtabula & Pittsburgh Ry. ..... (See Pitts. & Ashtabula Ry.)
Asheville & Spartanburg R. R. 5 g. 49 m. 2 lo. 12 c.
Jas. Anderson, *Supt. & Pur. Agt.* Spart'b'g, S. C.
Wm. Platt, *M. M.* ..... Spartanburg, S. C.
W. B. Brown, *M. C. B.* ..... Spartanburg, S. C.
Atchison, Topeka & Santa Fe R. R.
4-8½ g. 1,846 m. 203 lo. 8,108 cars.
C. C. Wheeler, *Gen. Man.* ..... Topeka, Kan.
D. J. Chase, *Gen. Supt.* ..... Topeka, Kan.
W. W. Allen, *Asst. Supt.* ..... Topeka, Kan.
F. M. Smith, *Pur. Agt.* ..... Topeka, Kan.
Geo. Hackney, *Asst. Sup. L. & C. Dept.* do.
Chem. Hackney, *Asst. Sup. L. & C. Dept.* do.
Eastern Div. : C. M. Rathbun, *Supt.* ..... Topeka, Kan
Henry Hull, *G. F. Car Dept.* ..... Topeka, Kan.
John Fagan, *M. M.* ..... Atchison, Kan.
J. M. Smith, *M. M.* ..... Kansas City, Mo.
Alfred Taylor, *M. M.* ..... Emporia, Kan.
Mid. Div. : H. R. Nickerson, *Supt.* Nickerson, Kan.
W. Y. Johnson, *M. M.* ..... Nickerson, Kan.
J. Q. Adams, *M. M.* ..... Dodge, Kan
Col. Div. : W. W. Borst, *Supt.* ..... La Junta, Col.
A. C. Stiles, *M. M.* ..... La Junta, Col.
D. H. Dotterer, *M. M.* ..... Raton, N. M.
Las Vegas D. : Geo. L. Sands, *Supt.* Las Vegas, N. M.
L. H. Waugh, *M. M.* ..... Las Vegas, N. M.
Rio G. Div. : Geo. L. Sands, *Supt.* Las Vegas, N. M.
J. H. Holman, *M. M.* ..... Wallace, N. M.
J. W. Sager, *M. M.* ..... San Marcial, N. M.
H. P. Olcott, *M. M.* ..... Deming, N. M.
Atlanta & West Point R. R. ..... (See *Western of Ala.*)
Atlantic & Pacific R. R. 4-8½ g. 286 m.
F. W. Smith *Gen. Supt.* ..... Albuquerque, N. M.
B. W. Angell, *Div. Supt.* ..... Albuquerque, N. M.
Geo. Chalender, *Supt. M. P. & M.* ..... do.
D. B. Sibley, *Pur. Agt.* ..... Chicago, Ill.
Augusta & Knoxville R. R. ..... 30 miles.
Gen. Supt & M. M. ..... Augusta Ga.

B

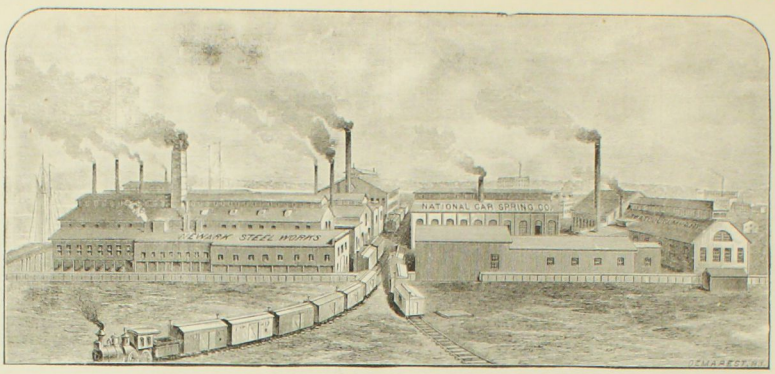
Baltimore & Ohio R. R.
4-8½ g. 1,539 m. 546 lo. 14,882 cars.
N. S. Hill, *Pur. Agt.* ..... Baltimore, Md.
E. Ohio Riv. Div. 4-8½ g. 972 m.
W. M. Clements, *Mast. Trans.* ..... Baltimore, Md.
N. E. Chapman, *Mast. of Mach.* ..... Baltimore, Md.
A. J. Cromwell, *Asst. M. of M.* ..... Baltimore, Md.
L. Packard, *M. C. B.* ..... Baltimore, Md.
I. N. Kalbaugh, *M. M.* ..... Baltimore, Md.
Wm. Edwards, *M. M.* ..... Martinsburgh, W. Va.
Sam'l Houston, *M. M.* ..... Bellaire, O.
Robert Maxwell, *M. M.* ..... Cumberland, Md.
S. B. Crawford, *M. M.* ..... Grafton, W. Va.
Alex. Laird, *M. M.* ..... Parkersburgh, W. Va.
Chas. Hirsch, *M. M.* ..... Wheeling, W. Va.
Pitts. Div. : T. M. King, *Gen. Supt.* ..... Pittsburg, Pa
E. Sampsell, *Asst. M. of M.* ..... Pittsburg, Pa.
Trans-Ohio Div. : B. Dunham, *G. Man.* ..... Newark, O.
W. H. Harrison, *Asst. M. of Mach.* ..... Newark, O.
Jos. Weisgerber, *M. M.* ..... Newark, O.
H. M. Ingler, *M. M.* ..... Bellaire, O.
O. B. Perkins, *M. M.* ..... Zanesville, O.
Andrew Beckert, *M. M.* ..... Sandusky, O.
F. J. Gunther, *M. M.* ..... Chicago Junction, O.
Chi. Div. : John Thomas, *Gen. Supt.* Chicago, Ill.
Benj. Lowther, *M. M.* ..... Garrett, Ind.
W. H. Wilkinson, *M. M.* ..... Kingston, Ill.
Baltimore & Potomac R. R. ..... (See *Penna. R. R.*)
Bangor & Piscataquis R. R. 4-8½ g. 63 m. 4 lo. 87 cars.
Arthur Brown, *Supt.* ..... Bangor, Me.
C. S. Nason, *M. M.* ..... Bangor, Me.
J. W. Comins, *M. C. B.* ..... Oldtown, Me.
Barclay R. R. 4-8½ g. 16 miles.
F. F. Lyon, *Supt.* ..... Barclay, Pa.
J. A. Hardenburg, *Pur. Agt.* 21 Cort. st., N. Y.
Wm. Johnson, *M. M.* ..... Towanda, Pa.
Bedford, Springville, Owensburg & Bloomfield Ry.
3 g. 41 m. 5 lo. 65 cars.
Jas. W. Kennedy, *Gen. Supt. & Pur. Agt.*; and
Capt. Geo. Elliott, *M. M.* ..... Bedford, Ind.
Richard G. Elliott, *M. C. B.* ..... Bedford, Ind.
Bellaire, Zanesville & Cin. Ry. Co. 3 g. 42 m. 3 lo. 20 c.
S. J. Cochran. *Mast. Trans.* ..... Bellaire, O.
Bell's Gap R. R. 3 g. 23 m. 4 lo. 190 cars.
R. G. Ford, *Supt.* ..... Bellwood (P. O.), Pa.
A. Zimmerman, *M. C. B.* ..... Bellwood, Pa.
Bennington & Rutland Ry. 4-8½ g. 9 m. 10 lo. 214 c.
F. C. White, *Supt. & Pur. Agt.* Bennington, Vt.
J. W. Blanchard, *M. M.* ..... Rutland, Vt.
Bingham, Canyon & Camp Floyd, and
Wasatch & Jordan Valley R. R.'s.
3 g. 44 m. 7 lo. 300 cars.
J. G. Kennedy, *Gen. Man.* Salt Lake City, Utah
Geo. M. Young, *Supt.* ..... do. do.
Bodie Tumbler Co. ..... 3 g. 34 miles.
Thomas Holt, *Supt. & Pur. Agt.* ..... Bodie, Cal
E. M. Luckett, *M. M. & C. B.* ..... Bodie, Cal.
Boston, Barre & Gardner. 4-8½ g. 36 m. 3 lo. 677 c.
H. M. Witter, *Supt. & Pur. Agt.* Worcester, Mass.
Chas. F. Brigham, *M. M.* ..... Worcester, Mass.
Boston Concord, Montreal & White Rts. R. R.
4-8½ g. 107 m. 34 lo. 677 cars.
James A. Dodge, *Gen. Man.* ..... Plymouth, N. H.
J. Thos. Vose, *Pur. Agt.* ..... Boston, Mass.
R. Adams, *M. M.* ..... Lake Village, N. H.
G. A. Ferguson, *Asst. M. M.* ..... Lake Village, N. H.
L. D. Pickering, *C. B.* ..... Lake Village, N. H.
Boston, Hoosac Tunnel & W'n Ry.
4-8½ g. 65 m. 18 lo. 1,038 cars.
H. L. Morrill, *Gen. Man.* ..... Saratoga, N. Y.
J. L. Butman, *Supt.* ..... Mechanicville, N. Y.
J. H. Wilder, *Pur. Agt* ..... Mechanicville, N. Y.
C. H. Corey, *M. M.* ..... Mechanicville, N. Y.
John S. Ellis, *M. C. B.* ..... Mechanicville, N. Y.
Boston, Revere Beach & Lynn R. R. 4 g. 9 m. 5 lo. 40 c.
C. J. Legro, *M. of Trans.* ..... Boston, Mass.
C. A. Hammond, *Supt. & P. Agt* Boston, Mass.
J. L. Folsom, *M. M.* ..... Boston, Mass.
John Cogrlan, *M. C. B.* ..... Boston, Mass.
Boston & Albany R. R. 4-8½ g. 372 m. 245 lo. 6,111 c.
W. H. Barnes, *Gen. Supt.* ..... Boston, Mass.
E. Gallup, *Asst. Supt.* ..... Springfield, Mass.
A. B. Underhill, *Su & M. P.* ..... Springfield, Mass.
F. D. Adams, *Gen. M. C. B.* ..... Allston, Mass.
H. B. Chesley, *Div. Supt.* ..... Boston, Mass.
G. H. Colby, *Div. M. M.* ..... Boston, Mass.
C. F. Grover, *Div. Supt.* ..... Springfield, Mass.
H. W. Eddy, *Div. M. M.* ..... Springfield, Mass.
J. B. Weston, *For. Car Sh* Springfield, Mass.
W. H. Russell, Jr., *Div. Supt.* E. Albany, N. Y.
T. B. Purvis, *Div. M. M.* ..... East Albany, N. Y.
J. E. Doran, *For. Car Sh.* ..... East Albany, N. Y.
Boston & Lowell and Concord R. Rs.
4-8½ g. 360 m. 110 lo. 2,211 cars.
H. C. Sherburne, *Man.* ..... Boston, Mass.
F. H. Nourse, *Pur. Agt* ..... Boston, Mass.
J. F. Crockett, *M. Trans.* ..... Boston, Mass.
Concord Divs. :
H. E. Chamberlain, *Supt. of P. A.* Concord, N. H.
J. T. Gordon, *M. M. & C. B.* ..... Concord, N. H.
Boston & Maine R. R. 4-8½ g. 206 m. 80 lo. 2,100 c.
J. T. Furber, *Gen. Supt. & P. A.* ..... Boston, Mass.
Wm. Smith, *M. M.* ..... Boston, Mass.
D. C. Richardson, *M. C. B.* ..... Lawrence, Mass.
Boston & N. Y. Air Line. 4-8½ g. 53 m. 9 lo. 156 c.
Supt ..... New Haven, Conn.
Boston & Providence R. R. 4-8½ g. 67 m. 52 lo. 1,006 c.
A. A. Folsom, *Gen. Supt* ..... Boston, Mass.
Geo. Richards, *M. M.* ..... Roxbury, Mass.
Jno. Lightner, *M. C. B.* ..... Roxbury, Mass.
Bradford, Bordell & Kinzua R. R. 3 g. 30 m. 6 lo. 80 c.
R. G. Williams, *Supt. & Pur. Agt.* Bradford, Pa.
John Delaney, *M. M. & C. B.* ..... Bradford, Pa.
Bradford, Eldred & Cuba R. R. ..... (See *Tonawanda, etc.*)
Breakwater & Frankford R. R. ..... (See *Del. & Bway.*)
Brighthope Ry. 3 g. 37 m. 3 lo. 193 cars.
Jas. R. Worth, *Supt.* ..... Richmond, Va.
A. Gary, *Sup't Way & Works.* Winterport, Me.
Alex. Calder, *M. M.* ..... Chester, Va.
Brunswick & Albany R. R. 5 g. 172 m. 13 lo. 170 c.
R. G. Thomas, *Supt. & Pur. Agt.* ..... Brunswick, Ga.
Buff., N. Y. & Phila. Ry. 3-6-4½ g. 242 m. 48 lo. 3,500 c.
Geo. S. Gatchell, *Gen. Supt.* ..... Buffalo, N. Y.
W. W. Evans, *Gen. Sup't to Co. Supt.* Buffalo, N. Y.
J. H. Poole, *Pur. Agt.* ..... Buffalo, N. Y.
Allen Vail, *Supt. M. P. & M.* ..... Buffalo, N. Y.
Buff. Div. : T. Gardiner, *Supt.* ..... Buffalo, N. Y.
Roch. Div. : R. M. Patterson, *Supt.* Rochester, N. Y.
N. G. Div. : J. W. Watson, *Supt.* ..... Oleau, N. Y.
Buff., Pittsburg & W'n R. R. 4-8½ g. 156 m. 50 lo. 975 c.
O. Watson, *Gen. Supt. & Pur. Agt.* Buffalo, N. Y.
E. H. Ritter, *Asst. Supt.* ..... Oil City, Pa.
H. J. Bookhammer, *M. M.* ..... Oil City, Pa.
John Monks, *M. C. B.* ..... Oil City, Pa.
Burlington, Cedar Rapids & Northern Ry.
4-8½ g. 713 m. 73 lo. 2,538 cars.
C. J. Ives, *Gen. Supt.* ..... Cedar Rapids, Ia.
Robt. Wallace, *Supt* ..... Cedar Rapids, Ia.
T. Stickney, *Pur. Agt* ..... Cedar Rapids, Ia.
R. W. Bushnell, *M. M. & C. B.* Cedar Rapids, Ia.
Burlington & Lamoille R. R. 4-8½ g. 30 m. 4 lo. 64 c.
G. L. Linsley, *Gen. Man. & Pur. Agt.* Burlington, Vt.
F. G. Brownell, *M. M., M. C. B. & P. A.* do.
Burlington & Missouri Riv. R. in Neb. ..... (See *C. B. & Q.*)
Burlington & North-West'n Ry. 3 g. 38 m. 3 lo. 85 c.
John T. Gerry, *Supt.* ..... Burlington, Ia.
Burlington & Ohio River R. R.
Gen. Man. & Pur. Agt. Chicago, Ill.
J. K. Lape, *Supt. of Equip.* ..... Chicago, Ill.

C

Camden & Atlantic R. R. 4-8½ g. 70 m. 16 lo. 364 c
F. A. Paul, *Supt & Pur. Agt.* ..... Camden, N. J.
Rufus Hill, *M. M.* ..... Camden, N. J.
Samuel Wills, *M. C. B.* ..... Camden, N. J.
Canada Southern Ry. 4-8½ g. 403 m. 80 lo. 2,367 c.
W. P. Taylor, *Gen. Man.* ..... Buffalo, N. Y.
A. F. Howland, *Pur. Agt.* ..... St. Thomas, Ont.
W. A. Story, *Gen. M. M.* ..... St. Thomas, Ont.
Rob't Potts, *Gen. M. C. B.* ..... St. Thomas, Ont.
Can. Div. : W. E. Carroll, *Supt.* ..... St. Thomas, Ont.
Robert Hunt, *M. C. B.* ..... St. Thomas, Ont.
U. S. Div. : E. P. Murray, *Supt.* ..... Detroit, Mich.
O. P. Dunbar, *M. M.* ..... Grosse Isle, Mich.
Canadian Pacific R. R. 4-8½ g. 503 m. 26 lo. 473 c.
W. C. Van Horne, *Gen. Man.* ..... Winnipeg, Man.
Eastern Div ..... 240 m. 16 lo. 276 cars.
Thos. Baker, *Gen. Supt.* ..... Montreal, Can.
Tho. Irwin, *Mech. Supt.* ..... Brockville, Ont.
Western Div ..... 311 m. 10 lo. 207 cars.
A. B. Mackney, *Gen. Supt.* ..... Winnipg., Man.
T. W. Shaughnessy, *Pur. Agt.* Winnipeg, Man.
F. C. Butterfield, *M. M. & C. B.* Winnipeg, Man.
Cape Fr. & Yadkin Val. R. R. 4-8½ g. 47 m. 3 lo. 31 c.
L. C. Jones, *Gen. Supt* ..... Fayetteville, N. C.
Isaac N. Clark, *M. M. & C. B.* Fayetteville, N. C.
Carolina Central R. R. ..... (See *Rul. & Augs.*)
Carson & Colorado R. R. ..... (See *Va. & Truckee*).
Catasauqua & Fogelsville 4-8½ g. 35 m. 4 lo. 577 c.
C. W. Chapman, *Supt. & P. A.* Catasauqua, Pa.
J. Thomas, *M. M.* ..... Hokendauqua, Pa.
Chas. J. Holbach, *M. C. B.* ..... Catasauqua, Pa.
Central and Southwestern Railroads in Ga.
5 g. 975 m. 127 lo. 1,858 cars.
W. G. Raoul, *V. P. and G. Man.* Savannah, Ga.
Wm. Sapp, *Gen. Supt.* ..... Savannah, Ga.
Henry Yonge, *Pur. Agt.* ..... Savannah, Ga.
Cen. Div. ; D. D. Arden, *M. M.* ..... Savannah, Ga.
John McCrary, *M. M.* ..... Augusta, Ga.
R. R. Barthlemess, *M. C. B.* ..... Savannah, Ga.
So.-West'n Div. : W. F. Shellman, *Supt.* Macon, Ga.
D. M. Gugel, *M. M.* ..... Macon, Ga.
James A. Knight, *M. C. B.* ..... Macon, Ga.
Central R. R. of N. J. 4-8½ g. 344 m. 29 lo. 27,198 c.
W. W. Stearns, *Gen. Supt.* ..... Elizabeth, N. J.
B. W. Burnett, *Pur. Agt* ..... New York, N. Y.
Cen Div. : W. Woodcock, *M. M.* Elizabethport, N. J.
Geo. Hackett, *M. C. B.* ..... Elizabethport, N. J.
C. G. Williams, *M. M.* ..... Jersey City, N. J.
John Alpaugh, *M. M.* ..... Phillipsburg, N. J.
Longb'r Div. : J. F. Randolph, *Supt.* Long Branch, N. J.
N. J. So. Div. : R. Blodgett, *Supt* ..... Manchester, N. J.
Wm. Montgomery, *M. M.* ..... Manchester, N. J.
Chas. N. Sawyer, *M. C. B.* ..... Manchester, N. J.
Lehigh & Susquehanna Div. :
W. S. Polhemus, *Supt.* ..... Mauch Chunk, Pa.
L. C. Brastow, *Supt. Mach.* ..... Mauch Chunk, Pa.
Central R. R. of S. C. ..... (See *Wil. & Wel.*)
Central Iowa Ry. 4-8½ g. 354 m. 49 lo. 1,950 cars.
D. N. Eckering, *Gen. Supt.* ..... Marshalltown, Ia.
John Player, *M. M.* ..... Marshalltown, Ia.
L. B. Seevers, *M. C. B.* ..... Marshalltown, Ia.
Central Pac. R. R. 4-8½ g. 3,780 m. 220 lo. 4,000 c.
A. N. Towne, *Gen. Man.* ..... San Francisco, Cal.
J. A. Fillmore, *Gen. Supt.* ..... San Francisco, Cal.
R. H. Pratt, *M. M. & C. B. Supt* ..... San Francisco, Cal.
J. R. Watson, *Gen. Pur. Agt.* ..... Sacramento, Cal.
A. J. Stevens, *Gen. M. M.* ..... Sacramento, Cal.
W. McKenzie, *Asst. Gen. M. M.* ..... Sacramento, Cal.
Benj. Welch, *Gen. M. C. B.* ..... Sacramento, Cal.
G. J. Turner, *Asst. Gen. M. C. B.* Sacramento, Cal.
Western ; Visalia & Tulare Divs. and Northern Ry.
A. D. Wilder, *Supt.* ..... W. Oakland, Cal.
W. F. Smith, *M. M.* ..... W. Oakland, Cal.
W. D. Ludlow, *M. C. B.* (W. Div.) ..... do.
S. J. Johnson, *M. M.* (T. Div.) ..... Tulare, Cal.
D. Hargrave, *M. M.* (N. Rd.) ..... Marysville, Cal.
Sacramento: Oregon Divs. ; and Cal. Pac. R. R.
J. B. Wright, *Supt.* ..... Sacramento, Cal.
M. W. Smiley, *M. M.* ..... Sacramento, Cal.
Phil. Douglas, *For. Car Sh.* Sacramento, Cal.
Truckee Div. : Frank Free. *Supt.* Wadsworth, Nev.
Geo. Gregg, *M. M.* ..... Los Angeles, Cal.
Wm. McPherson, *F. Car Sh.* Wadsworth, Nev.
Humb't Div. : G. W. Coddington, *Supt.* Carlin, Nev.
W. F. Smith, *M. M.* ..... Carlin, Nev.
J. C. Doughty, *For. Car Sh* ..... Carlin. Nev.
Salt Lake Div. : A. G. Fell, *Supt* ..... Ogden, Utah.
James Lamb, *M. M.* ..... Ogden, Utah.
A. Sherburne, *For. Car Sh* ..... Ogden, Utah.
Los Angeles; and Yuma Divs. (So. Pac.):
E. E. Hewitt, *Asst. Supt* ..... Los Angeles, Cal.
James Velsir, *M. M.* ..... Los Angeles, Cal.
J. S. Young, *For. Car Sh.* ..... Los Angeles, Cal.
Arizona Div. (So. Pac.) ..... Tucson, Ariz.
A. A. Bean, *Asst. Supt* ..... Tucson, Ariz.
W. F. Smith, *M. M.* ..... Tucson, Ariz.
Rio Grande and El Paso Divs. (So. Pac.):
J. Campbell, *Ass't Supt* ..... El Paso, Texas.
W. Standish, *For. Sh.* ..... El Paso, Texas.
Central Vermont R. R. 4-8½ g. 548 m. 132 lo. 2,222 c.
J. W. Hobart, *Gen. Supt.* ..... St. Albans, Vt.
J. M. Foss, *Asst. Gen. Supt. & M. M.* St. Albans, Vt.
No. Div. : B. Fuhvoye, *Supt.* ..... St. Johns, P. Q.
Rut. Div. : J. Burdett, *Supt* ..... Rutland, Vt.
N. L. Davis, *M. M. & C. B.* ..... Rutland, Vt.
Brat. Div. : E. F. Brooks, *Supt* ..... Brattleboro, Vt.
New London & No'n R. R. 143 m. 22 lo. 303 c.
G. W. Bentley, *G. Supt. & P. A.* ..... New London, Ct.
I. W. Dow, *M. M.* ..... New London, Ct.
S. O. Banks, *M. C. B.* ..... New London, Ct.
Charleston & Savannah Ry. 5 g. 115 m. 17 lo. 98 c.
H. S. Haines, *Gen. Man.* ..... Savannah, Ga.
C. S. Gadsden, *Gen. Supt.* ..... Charleston, S. C.
H. A. Ulmo, *M. M.* ..... Savannah, Ga.
Charlotte, Columbia & Augusta R. R. ..... (See *Rich. & D.*
Chattanooga R. R. 3 g. 34 m. 2 lo. 125 cars.
A. L. Inman, *Gen. Man.* ..... Plattsburg, N. Y.
J. M. Davis, *Supt. & M. M.* ..... Plattsburg, N. Y.
Chattaroi Ry. 4-8½ g. 43 miles 11 loco. 483 cars.
C. H. Rockwell, *Gen. Man. & P. A.* Ashland, Ky.
J. R. Martin, *M. M.* ..... Ashland, Ky.
John P. Burleigh, *M. C. B.* ..... Ashland, Ky.
Cheraw & Chester R. R. 3 g. 30 m. 3 lo. 38 cars.
W. H. Harding, *Pres. & Supt.* ..... Chester, S. C.
A. M. Manning, *M. M.* ..... Chester, S. C.
Cheraw & Darlington R. R. ..... (See *Wil. & Wel.*)
Cheraw & Salisbury R. R. ..... (See *Wil. & Wel.*)
Cherokee R. R. 3 g. 37 m. 5 lo. 72 cars.
John Postel, *Manager* ..... Cedartown, Ga.
C. E. Scruton, *M. M. & C. B.* ..... Cedartown, Ga.
Chesapeake, Ohio & So.-W'n 4-9 g. 398 m. 39 lo. 989 c.
R. Meek, *G. S. & Pur. Agt.* ..... Louisville, Ky.
F. H. Britton, *Mast. Trans* ..... Jackson, Ky.
W. D. Robb, *S. M. P. & M.* ..... Elizabethtown, Ky.
Geo. Dickey, *M. M.* ..... Elizabethtown, Ky.
H. A. Wendell, *M. M.* ..... Paducah, Ky.
Chesapeake & Ohio Ry. 4-8½ g. 642 m. 133 l. 3,543 c.
C. W. Smith, *Gen. Man.* ..... Richmond, Va.
D. A. Smith, *Asst. to Gen. Man.* Richmond, Va.
A. H. Wood, *Asst. Gen. Supt.*, Huntington, W. Va.
A. S. Emmons, *Pur. Agt.* ..... Richmond, Va.
John McFarland, *Pur. Agt. M. P.* ..... Richmond, Va.
Eastern Div. : E. T. Smith, *Supt.* ..... Richmond, Va.
J. N. King, *M. C. B.* ..... Richmond, Va.
Hunt. Div. : W. P. Harris, *Supt.* ..... Huntington, W. Va.
T. L. Chapman, *Asst. Supt. M. P.*, and
H. C. Bassinger, *M. C. B.* Huntington, W. Va.
Lex. Div. : J. D. Farrington, *Supt.* ..... Lexington, Ky.
Chesnire R. R. 4-8½ g. 80 m. 30 lo. 499 cars.
R. Stewart, *Gen. Man.* ..... Keene, N. H.
H. E. Spencer, *Asst. Gen. Man.* ..... Keene, N. H.
F. A. Perry, *M. M.* ..... Keene, N. H.
A. E. Howard, *G. For. Car Sh.* ..... Keene, N. H.
Chester & Lenoir R. R. 3 g. 50 m. 3 lo. 70 cars.
James Mason, *Supt.* ..... Yorkville, S. C.
T. P. Beard, *M. M.* ..... Yorkville, S. C.
Chicago, B. & Kan. City Ry. 4-8½ g. 181 m. 9 lo. 130 c.
Robt. Law, *Gen. Supt.* ..... Keokuk, Ia.
W. H. Barnhart, *Asst. M. M.* ..... Burlington, Ia.
Chicago, Burlington & Quincy R. R.
4-8½ g. 2,924 m. 521 lo. 18,955 cars.
T. J. Potter, *Gen. Man.* ..... Chicago, Ill.
(1) C. B. & Q. Mast. of Mo. Riv. 1,059 m.
H. B. Stone, *Gen. Supt.* ..... Chicago, Ill.
Geo. B. Harris, *Pur. Agt* ..... Chicago, Ill.
G. W. Rhodes, *Supt. M. P.* ..... Aurora, Ill.
Wm. Forsyth, *Mech. Eng.* ..... Aurora, Ill.
Ill. Divs. : J. D. Besler, *Supt.* ..... Galesburg, Ill.
Chi. Div. ; Geo. Alexander, *Supt.* ..... Aurora, Ill.
L. E. Johnson, *M. M.* ..... Aurora, Ill.
Galesburg Div. : F. C. Rice, *Supt* Galesburg, Ill.
Robert Colville, *M. M.* ..... Galesburg, Ill.
St. L. Div. : S. E. Crance, *Supt.* ..... St. Louis, Mo.
A. Forsyth, *M. M.* ..... Beardstown, Ill.
Ia. & Mo. Divs. : ..... *Supt.* Burlington, Ia.
East. Div. : O. E. Stewart, *Supt.* Burlington, Ia.
Joel West, *M. M.* ..... Burlington, Ia.
Mid. Div. : J. B. Maxon, *Supt* ..... Ottumwa, Ia.
West. Div. : W. B. Ryder, *Supt.* ..... Creston, Ia.
C. W. Eckerson, *M. M.* ..... Creston, Ia.
(2) C., B. & Q., West of Mo. Riv. 955 miles.
G. W. Holdrege, *Gen. Supt.* ..... Omaha, Neb.
Jas. M. Barney, *Pur. Agt* ..... Omaha, Neb.
D. Hawksworth, *Gen. M. M.* Plattsmouth, Neb.
Bur. & Mo. Riv. & Neb. Ry. Divs. :
D. E. Thompson, *Supt.* ..... Lincoln, Neb.
E. Bignal, *M. M.* ..... Lincoln, Neb.
R. V. Div. : A. Campbell, *Supt.* ..... Hastings, Neb.
A. & K. Div. : J. McConnell, *Supt* ..... Lincoln. Neb.
Chicago, Milwaukee & St. Paul R. R.
4-8½ g. 4,383 m. 425 lo. 13,659 cars.
S. S. Merrill, *Gen. Man.* ..... Milwaukee, Wis.
J. T. Clark, *Gen. Pur. Agt.* ..... Milwaukee, Wis.
J. T. Crocker, *Pur. Agt.* ..... Milwaukee, Wis.
J. M. Lowry, *Gen. M. M.* ..... Milwaukee, Wis.
John Bahlke, *Supt. Car Dept.* Milwaukee, Wis.
(1) H. C. Atkins, *Asst. Gen. Supt.* Milwaukee, Wis.
Chi. Div. : S. J. Collins, *Supt* ..... Chicago, Ill.
La Crosse Div. : W. G. Ellis, *Supt.* Milwaukee, Wis.
C. Bluffs Div : A. J. Earling, *Supt.* ..... Marion, Ia.
P. du C. & M. Pt. Divs :
R. B. Campbell, *Supt.* ..... Milwaukee, Wis.
(2) C. H. Prior, *Asst. Gen. Supt.* Minneapolis, Minn.
H. & D. Div. : C. W. Case, *Supt* Minneapolis, Minn.
J. L. Hattie, *M. M.* ..... Minneapolis, Minn.
Ia. & Minn. Div. : H. R. Williams, *Supt.* do.
So. Minn. & River Divs. :
F. D. Underwood, *Supt* ..... La Crosse, Wis.
Ia. & Da. Div. : G. W. Sanborn, *Supt.* Mason City, Ia.
S. Cy. & Da. Div. : J. Jackson, *Supt.* Sioux City, Ia.
F. H. Stanton, *M. M.* ..... Yankton, Dak.
Dubuque Div. : J. H. Jenkins, *Supt.* Dubuque, Ia.
S. Charaley, *M. M.* ..... Dubuque, Ia.
(3) D. A. Ellis, *Asst. Gen. Supt.* ..... Racine, Wis.
So.-Wn. Divs. : D. L. Bush, *Supt.* ..... Racine, Wis.
John Taylor, *M. M.* ..... Racine, Wis.
E. A. Eddy, *M. C. B.* ..... Racine, Wis.
Northern Div. : L. B. Rock, *Supt.* Milwaukee, Wis.
Wis. & Minn. Divs. : C. H. Goodnow, *M. C. B.* Milwaukee, Wis.
Chicago, Pekin & So.-W'n R. R. 4-8½ g. 88 m. 8 lo. 455 c.
A. H. Crocker, *Rec.* ..... Joliet, Ill.
J. N. Gibson, *M. C. B.* ..... Streator, Ill.
Chicago, Rock Island & Pac. Ry.
4-8½ g. 1,381 m. 300 lo. 7,760 cars.
R. R. Cable, *V. P. & Gen. Man.* ..... Chicago, Ill.
A. Kimball, *Gen. Supt.* ..... Chicago, Ill.
F. A. Marsh, *Pur. Agt.* ..... Chicago, Ill.
T. B. Twombly, *Gen. M. M.* ..... Chicago, Ill.
B. K. Forbes, *Gen. M. C. B.* ..... Chicago, Ill.
Ill. Div. : R. H. Chamberlin, *Supt.* ..... Chicago, Ill.
R. Biester, *M. M.* ..... Chicago, Ill.
Sam'l Tillman, *M. C. B.* ..... Chicago, Ill.
Ia. Div. : H. F. Royce, *Supt* ..... Des Moines, Ia.
J. G. Crockett, *M. M.* ..... Stuart, Ia.
Jas. E. Morrill, *M. C. B.* ..... Davenport, Ia.
Chas. M. Leonard, *M. C. B.* ..... Davenport, Ia.
So.-Wn. Div. : G. F. Walker, *Supt.* ..... Trenton, Ia.
W. G. Mitchell, *M. M.* ..... Trenton, Ia.
Chas. R. Best, *M. C. B.* ..... Trenton, Ia.
K. & Des. M. Div. : Jno. Given, *Supt.* ..... Keokuk, Ia.
S. W. Wakefield, *M. M.* ..... Keokuk, Ia.
Henry Kummer, *M. C. B.* ..... Keokuk, Ia.
Chi., Saginaw & Can. R. R. 4-8½ g. 38 m. 4 lo. 10 c.
J. A. Howell, *Gen. Man. & Pur. Agt* St. Louis, Mich.
Jas. T. Hall, *Supt.* ..... St. Louis, Mich.
Chicago, St. Louis & New Orleans R. R.
4-8½ g. 671 m. 101 lo. 1,910 cars.
J. C. Clarke, *V. P. & G. Man.* New Orleans, La.
L. T. Brien, *Asst. Gen. Man.* New Orleans, La.
C. M. Reade, *Gen. Supt.* ..... New Orleans, La.
H. B. Fehiger, *Pur. Agt* ..... New Orleans, La.
W. H. Purdy, *Supt. Mach.* McComb City, Miss.
Geo. W. Keller, *M. M.* ..... McComb City, Miss.
So. Div. : E. D. Anderson, *Acting Supt.* ..... do.
W. P. McKelvey, *M. M.* ..... McComb City, Miss.
No. Div. : J. G. Mann ..... Jackson, Tenn.
J. M. Keith, *M. M.* ..... Jackson, Tenn.
J. F. White, *M. M.* ..... Water Valley, Miss.
Chicago, St. Paul, Minneapolis & Omaha Ry.
4-8½ g. 1,037 m. 131 lo. 4,088 cars.
C. F. Hatch, *Gen. Supt* ..... St. Paul, Minn.
W. H. S. Wright, *Pur. Agt* ..... St. Paul, Minn.
Matt. Ellis, *M. M.* ..... St. Paul, Minn.
W. H. Rice, *M. C. B.* ..... St. Paul, Minn.
Ea. & No. Div. : T. P. Gere, *Supt.* St. Paul, Minn.
St. Paul Div. : J. F. Lincoln, *Supt* St. Paul, Minn.
Sioux City Div. : H. Spencer, *Supt.* Sioux City, Ia.
W. F. Heintselman, *G. F. Sh.* Sioux Cy., Ia.
Neb. Div. : G. V. Morford, *Supt* ..... Omaha. Neb.
Chicago, Texas & Mexican Central Ry.
4-8½ g. 52 m. 4 lo. 60 cars.
Gen. Supt ..... Dallas. Tex.
Chas. Howard, *Pur. Agt* ..... Chicago, Ill.
Chicago & Alton R. R. 4-8½ g. 840 m. 213 lo. 6,148 c.
J. C. McMullin, *Gen. Man.* ..... Chicago, Ill.
C. H. Chappell, *Act. Gen. Man.* ..... Chicago, Ill.
W. F. Merrill, *Gen. Supt* ..... Chicago, Ill.
A. V. Hartwell, *Pur. Agt.* ..... Chicago, Ill.
Wm. Wilson, *Supt. of Mach.* ..... Bloomington, Ill.
Jos. Townsend, *G. For. Car Dept.* do.
Chi. Div. : A. M. Richards, *Supt.* ..... Bloomington, Ill.
St. Louis Div. : T. M. Bates, *Supt.* ..... Roodhouse, Ill.
Kan. Cy. Div. : O. Vaughan. *Supt.* ..... Slater, Mo.
Wm. McPhail, *M. M.* ..... Slater, Mo.
Chi. & East'n Ill. 4-8½ g. 248 m. 56 lo. 3,500 cars.
O. S. Lyford, *Gen. Supt.* ..... Chicago, Ill.
D. R. Patterson, *Pur. Agt.* ..... Chicago, Ill.
P. W. Drew, *M. Trans.* ..... Chicago, Ill.
Allen Cooke, *M. M.* ..... Danville, Ill.
Chicago & Grand Trunk Ry. ..... (See *Grand Trunk.*)
Chicago & Iowa R. R. 4-8½ g. 104 m. 16 lo. 237 cars.
T.

BENJAMIN ATHA, Treasurer. RICHARD VOSE, President.

We make our own Steel for Car Springs.



Spring Manufactory and Steel Works, Newark, N. J.

The Largest Crucible Cast-Steel Works in the Eastern States.

NATIONAL CAR SPRING COMPANY,

MANUFACTURERS OF

Elliptic, Volute-Spiral Hebbard, Oval, Round Bar, Rectangular-Passenger & Freight Car Springs

OFFICE, 13 BARCLAY STREET, NEW YORK.

IN THE PATENT FIGHT

BETWEEN

D. A. HOPKINS, of 113 Liberty Street, N. Y.,

PATENTEE AND MANUFACTURER OF

SELF-FITTING JOURNAL BEARINGS,

AND

T. V. LE ROY,

A SECOND DECISION WAS RENDERED JUNE 7, 1881,

IN FAVOR OF HOPKINS.

The closing paragraphs of said decision read as follows:

"As the proofs stand, therefore, Hopkins was the first to conceive, the first to disclose to others, the first to embody in models, the first to reduce to practice, and the first to apply for a patent. Le Roy was first to obtain a patent, but under circumstances which do not give him the prima facie case which a patent usually implies."

"We must find priority of invention to be with D. A. Hopkins, and affirm the examiner's decision."

H. H. BATES,
R. L. B. CLARKE,
R. G. DYRENFORTH,
Examiners-in-Chief.

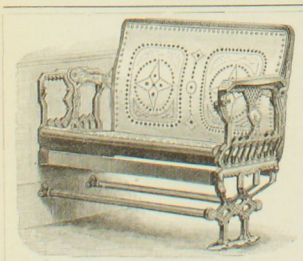
WILSON, WALKER & CO.

(LIMITED).

MANUFACTURERS OF ALL KINDS OF

RAILROAD CAR AND LOCOMOTIVE FORGINGS,

PITTSBURGH, PA.



Gardner's New Reversible Car Seat, No. 8,

Patented December 6th, 1881.

☞ *Please send for Descriptive Circular giving full particulars and prices.*

As the back reverses, it raises the front of the seat so as to prevent the passenger from slipping off of the seat, and removes the objection made to this kind of seat heretofore.

The large orders already received from the N. Y. C. & H. R. R. R. and other prominent companies for our No. 8 Seat is the best guarantee of its merit.

Made with perforated Veneer, Leather, Plush and Rattan Seats and Backs, which are interchangeable; one kind of seat can be used in the Summer and the other in the Winter.

GARDNER & CO.,

Patentees and Manufacturers of Car Seats, Car Ceilings, Depot Seats, &c.,

183 CANAL ST., NEW YORK CITY.

Factory, 330 to 342 E. 61st St.

LOWE'S METALLIC PAINT CO.

CHATTANOOGA, TENN.

THE BEST PAINT EVER OFFERED TO THE PUBLIC

It is now being sold to **50 Railroad Companies,** several of the largest Car and Wagon Manufactories, Machine Shops, Wrought Iron Bridge Works, Dry Docks, Ship Yards and Tin and Sheet Iron Roofers in the United States and Canada.

SPECIAL LOW RATES OF FREIGHT TO ALL POINTS.

Send for prices containing the best and largest number of certificates ever published of any one article.

Cumberland Valley R. R. 4-9 g. 125 m. 21 lo. 430 cars.
J. F. Boyd, *Supt*.....Chambersburg, Pa.
A. S. Hill, *M. M.*.....Chambersburg, Pa.
C. Wicker, *F. C. R.*.....Chambersburg, Pa.
Cumberland & Penn. R. R. 4-8½ g. 55 m. 28 lo. 625 c.
P. L. Burwell, *Gen. Supt & P. A.*Cumberland, Md.
N. W. Howson, *Mast. of Mach.*Mt. Savage, Md.
Nathan Bixix, *M. C. B.*.....Mt. Savage, Md.

D

Danbury & Norwalk R. R. 4-8½ g. 33 m. 6 lo. 100 c.
L.W. Sandiforth, *G. Supt. & P. A.*.S. Norwalk Ct.
N. M. George, *M. M. & M. C. B.*...Danbury, Conn.
Danville, Mocksville & So.-Wn. R. R. 3 g. 28 m.
H. W. Goodrich, *Ch. Eng.*.....Leakesville, N. C.
Danville, Olney & O. R. R. R. 4-8½ g. 110 m. 4 lo. 83 c.
Jas. R. Maxwell, *G. Man. & P. A.*.....Olney, Ill.
J. M. Graham, *Supt*.....Kansas, Ill.
Louis Parison, *M. M & C. B.*.....Kansas, Ill.
Dayton & Union R. R. *(See Ohio Riv.)*
Del., Lackawanna & W. and N. Y., Lack. & W. R. Rs. 4-8½ g. 470 m. 348 lo. 20,187 cars.
Wm. F. Halstead, *Gen. Supt*.....Scranton, Pa.
G. W. B. Cushing, *Pur. Agt*.....New York, N. Y.
Walter Dawson, *Mast. of Mach.*.....Scranton, Pa.
Robt. McKenna, *M. C. B.*.....Scranton, Pa.
Bloomsb'g Div.: C. Graham, *M. M.*.Kingston, Pa.
Utica Div.: A. C. Salisbury, *Supt*.....Utica, N. Y.
Thos. Thatcher, *M. M.*.....Utica, N. Y.
Morris & Essex Div.; Sussex; P. & D. and C. R. Rs. A. Reasoner, *Supt*.....Hoboken, N. J.
W. H. Lewis, *M. M.*.....Kingsland, N. J.
J. W. Baker, *Mast. Car Rep.*.....Dover, N. J.
Oswego & Syracuse Div.:
W. B. Phelps, *Supt*.....Oswego, N. Y.
Jas. Buchanan, *M. M.*.....Syracuse, N. Y.
Syracuse, Binghamton & New York R. R. 4-8½ g. 81 m. 20 lo. 508 cars.
W. K. Niver, *Gen. Supt*.....Syracuse, N. Y.
Jas. Buchanan, *M. M.*.....Syracuse, N. Y.
Delaware Western R. R. 4-8½ g. 20 m. 4 lo. 35 cars.
David Connell, *Supt*.....Wilmington, Del.
Delaware & Chesapeake R. R. 4-8½ g. 54 m. 3 lo. 16 c.
O. S. Sanford, *Supt*.....Oxford, Md.
Joseph A. Hayward, *M. M.*.....Oxford, Md.
Chas. E. Mason, *M. C. B.*.....Oxford, Md.
Delaware & Hudson Canal Co.
4-3 and 4-8½ g. 500 m. 151 lo. 9,248 cars.
C. P. Young, *Gen. Man.*.....Honesdale, Pa.
C. F. Young, *Pur. Agt*.....Albany, N. Y.
R. C. Blackall, *Supt. of Mach.*.....Albany, N. Y.
Susq. Div.: C. D. Hammond, *Supt*. Albany, N. Y.
C. A. Jones, *M. M.*.....Oneonta, N. Y.
J. R. Skinner, *M. C. B.*.....Oneonta, N. Y.
Sar. & Ch. Divs.: T. Voorhees, *Supt*...Troy, N. Y.
J. L. Corey, *M. M.*.....Green Island, N. Y.
Chr. Körner, *M. C. B.*.....Green Island, N. Y.
Pa. Div.: R. Manville, *Supt & Pur. Agt.*.and
S. H. Dotterer, *M. M.*.....Carbondale, Pa.
T. Orchard, *M. C. B.*.....Carbondale, Pa.
Denver & New Orleans. 4-8½ g. 140 m. 11 lo. 400 c.
S. W. Eccles, *Gen. Sup.*.....Denver, Col.
Chas. Wheeler, *Pur. Agt*.....Denver, Col.
S. P. Weller, *M. M. & M. C. B.*.....Denver, Col.
Denver & Rio Grande Ry. 3 g. 1,062 m. 170 lo. 4,617 c.
D. C. Dodge, *Gen. Man.*.....Denver, Col.
Henry Wood, *Gen. Supt*.Salt Lake City, Utah.
Geo. W. Ristine, *Asst. Gen. Man.*.....Denver, Col.
A. B. Garner, *Pur. Agt*.....Denver, Col.
N. W. Sample, *M. M.*.....Denver, Col.
M. C. B......Burnham, Col.
1st Div.: W. H. Bancroft, *Supt*.....S. Pueblo, Col.
2d Div.: R. M. Ridgway, *Supt*.....Alamosa, Col.
3d Div.: Cole Lesion, *Supt*.....Leadville, Col.
4th Div.: J. A. Myers, *Supt*.....Salida, Col.
Des Moines & Ft. Dodge. 4-8½ g. 143 m. 13 lo. 232 c.
C. N. Gilmore, *Supt*.....Des Moines, Ia.
John McGrew, *M. M.*.....Grand Junction, Ia.
E. A. Avery, *M. C. B.*.....Grand Junction, Ia.
Det., Gr. H. & Mil. Ry. 4-8½ g. 180 m. 36 lo. 678 c.
G. R. Nash, *Gen. Man.*.....Detroit, Mich.
John S. Lorimer, *Storekeeper*.....Detroit, Mich.
W. J. Morgan, *Supt*.....Detroit, Mich.
F. Parker, *Mech. Supt*.....Detroit, Mich.
Det., Lansing & No'n R. R. 4-8½ g. 222 m. 84 lo. 1027 c.
John Mulliken, *Gen. Man.*.....Detroit, Mich.
Allan Bourn, *Pur. Agt*.....Detroit, Mich.
Thos. M. Fish, *Gen. Supt*.....Ionia, Mich.
Geo. Watrous, *M. M. & C. B.*.....Ionia, Mich.
Det., Mack. & Marq. R. R. 4-8½ g 151 m. 16 lo. 1112 c.
D. McCool, *Gen. Supt*.....Marquette, Mich.
E. W. Allen, *Pur. Agt*.....Marquette, Mich.
John Wilson, *Mech. Supt*.....Marquette, Mich.
Dorchester & Delaware R. R. 4-8½ g. 33 m.
Wm. Smith, *Supt*.....Cambridge, Md.
Dubuque & Dakota R. R. 4-8½ g. 64 m. 2 lo. 54 cars.
A. C. Goodrich, *Supt*.....Waverly, Ia.
W. S. Couch, *Pur. Agt*.....Dubuque, Ia.
Duck River Valley R. R. 3 g. 34 m.
Geo. Childress, *Supt*.....Columbia, Tenn.
Dunkirk, Allegheny Valley & Pittsburgh R. R. 4-8½ g. 91 m. 14 lo. 102 cars.
D. Thayer, *Gen. Supt*.....Dunkirk, N. Y.
E. Root, *Pur. Agt*.....New York, N. Y.
J. C. Haggett, *M. M. & C. B.*.....Dunkirk, N. Y.

E

East Broad Top R. R. 3 g. 30 m. 6 lo. 191 cars.
A. W. Sims, *Supt*.....Orbisonia, Pa.
A. B. Greenwood, *M. M.*.....Orbisonia, Pa.
East Tennessee, Virginia & Georgia R. R.
5 g. 1,185 m. 133 lo. 1,597 cars.
Henry Fink, *V. P. & Gen. Man.*Lynchburg, Va.
J. F. O'Brien, *Gen. Supt*.....Knoxville, Tenn.
East Tenn. div. and No. Car. and Ohio Branches:
F. K. Huger, *Supt*.....Knoxville, Tenn.
B. J. Sitton, *M. M.*.....Knoxville, Tenn.
Jos. Armbruster, *M. C. B.*.....Knoxville, Tenn.
Alabama Div.: J. M. Bridges, *Supt*.....Selma, Ala.
Simon Gay, *M. M.*.....Selma, Ala.
W. W. Pierce, *M. C. B.*.....Selma, Ala.
Memphis & Charleston R. R. (Div.):
R. B. Pegram, *Jr., Supt*.....Memphis, Tenn.
H. N. Burford, *M. M.*.....Memphis, Tenn.
Macon & Brunswick Div.:
J. F. Mallory, *Supt*.....Macon, Ga.
C. H. Beale, *M. M.*.....Macon, Ga.
Ga. Div.: O. V. McCracken, *Supt*.....Atlanta, Ga.
Eastern R. R. 4-8½ g. 283 m. 60 lo. 2,208 cars.
D. W. Sanborn, *Asst. of Trans. Boston, Mass.*
Geo. J. Alber, *Pur. Agt*.....Boston, Mass.
Amos Pillsbury, *S. M. P. & M.*...Boston, Mass.
J. D. Billings, *G. F. & P. Agt*.....Salem, Mass.
Con'y Div.: J. W. Sanborn, *Supt.*, Wolfboro' J., N. H.
Eastern Kentucky R. R. 4-8½ g. 34 m. 5 lo. 125 c.
H. W. Bates, *Mas. & Pur. Agt*.....Riverton, Ky.
D. S. Warner, *M. M.*.....Riverton, Ky.
Eastern Shore R. R. 4-8½ g. 38 m. 2 lo.
W. Simpson, *Supt*.....Princess Anne, Md.
F. Strattner, *M. M.*.....Princess Anne, Md.
Elberton Air-Line R. R. *(See Rich. & Dan. N. G. Rrs.)*
Elizabeth City & Norfolk R. R. 4-8½ g. 79 m. 5 lo. 96 c.
M. K. Klug, *Gen. Man. & Pur. Agt.*Norfolk, Va.
J. S. Whitworth, *M. M. & C. B.*.....Norfolk, Va.
Erie & Pittsburgh R. R. *(See Pennsylvania Co.)*
Eureka & Palisade R. R. 3 g. 97 m. 7 lo. 124 cars.
P. Everts, *Gen. Supt & P. Agt*.Eureka, Nev.
J. S. Mills, *M. M.*.....Palisade, Nev.
A. S. Longley, *M. C. B.*.....Palisade, Nev.
Europ. & No. Amer. Ry. 4-8½ g. 114 m. 15 lo. 557 c.
W. Crane, *Supt. & Pur. Agt*.....Bangor, Me.
A. O. Bailey, *M. M. & C. B.*Mattawamkeag, Me.
Evansville, Paducah & Cairo Line. 200 miles.
Evansville, Ind.
Evansville, Rockport & E'n Ry. 4-9 g. 71 m. 5 lo. 98 c.
H. L. Shepard, *Supt*.....Evansville, Ind.
Evans. & Terre Haute. 4-8½ g. 145 m. 26 lo. 900 c.
C. J. Hepburn, *Gen. Supt*.....Evansville, Ind.
John Torrance, *Gen. Pur*.....Evansville, Ind.

F

Fitchburg R. R. 4-8½ g. 180 m. 100 lo. 3,315 cars.
John Adams, *Gen. Supt*.....Boston, Mass.
E. K. Turner, *Asst. Supt*.....Fitchburg, Mass.
F. S. Pratt, *Pur. Agt*.....Boston, Mass.
G. A. Coolidge, *Supt. M. P.*.....Boston, Mass.
W. A. Foster, *Asst. Supt. M. P.*.Fitchburg, Mass.
J. W. Marden, *M. C. B.*.....Charlestown, Mass.
Flint & Pere Marq. 4-8½ g. 345 m. 68 lo. 1,854 cars.
H. C. Potter, *Gen. Man.*.....E. Saginaw, Mich.
D. Edwards, *Asst. Gen. Man.*.E. Saginaw, Mich.
G. G. Cook, *Pur. Agt*.....E. Saginaw, Mich.
Sanford Keeler, *Gen. Supt*..E. Saginaw, Mich.
W. F. Potter, *Supt. (E. Div.)*..E. Saginaw, Mich.
M. V. Meredith, *Supt. (W. Div.)*.E. Saginaw, Mich.
T. J. Hatswell, *M. M.*.....E. Saginaw, Mich.
R. McPherson, *M. C. B.*.....E. Saginaw, Mich.
Florida Central & Western R. R.
5 g. 234 m. 10 lo. 160 cars.
Wm. M. Davidson, *Gen. Man.*Jacksonville, Fla.
Jas. S. McElroy, *Supt*.....Tallahassee, Fla.
Florida Southern Ry. 3 g. 91 m. 6 lo. 96 cars.
H. S. Ming, *Gen. Supt*.....Palatka, Fla.
M. R. Miller, *M. M. & C. B.*.....Palatka, Fla.
Florida Transit R. R. 5 g. 234 m.
D. E. Maxwell, *Gen. Supt*.....Fernandina, Fla.
John Hedges, *Pur. Agt*.....Fernandina, Fla.
R. V. Dahoney, *M. M.*.....Fernandina, Fla.
G. Hernandez, *M. C. B.*.....Fernandina, Fla.
Fonda, Johnst'n & Gloversv. 4-8½ g. 26 m. 5 lo. 18 c.
Lawton Caten, *Supt*.....Gloversville, N. Y.
Fond du Lac & Peoria. 3 g. 30 m. 2 lo. 35 cars.
Alonzo Kinyon, *Supt. & P. A.*Fond du Lac, Wis.
Fort Dodge & Fort Ridley R. R. 4-8½ g.
D. R. Peasley.....Fort Dodge, Ia.
Ft. Madison & No.-West'n Ry. 3 g. 41 m. 4 lo. 120 c.
S. B. Kenrick, *Supt. & Pur. Agt*.Ft. Madison, Ia.
L. Leash, *M. M.*.....Ft. Madison, Ia.
Ft. Wayne, Cin. & Louisv. 4-8½ g. 108 m. 9 lo. 240 c.
White Water R. R. 4-8½ g. 62 m. 5 lo. 170 cars.
W. W. Worthington, *Gen. Supt*.....Ft. Wayne, Ind.
W. D. Morris, *M. M. & C. B.*.....Ft. Wayne, Ind.
C. W. Hollister *M. M. & C. B.*...Jackson, Mich.
Fulton County N. G. Ry. 3 g. 61 m. 3 lo. 106 cars.
A. C. Atherton, *Gen. Supt. & P. Agt*.Lewiston, Ill.

G

Galveston, Harrisburg & San Antonio Ry.
4-8½ g. 492 m. 47 lo. 1870 cars.
Jas. Converse, *Gen. Supt*.....Galveston, Tex.
Chas. Babbidge, *Pur. Agt*.....Boston, Mass.
D. T. Davis, *Supt. M. P. & M.*..Harrisburg, Tex.
James Alexander, *M. C. B.*..Harrisburg, Tex.
El Paso Div. *(See Cen. Pac.)* 4-8½ g. 144 miles.
Galveston, Houston & Henderson R. R.
4-8½ g. 50 m. 17 lo. 217 cars.
W. H. Harding, *G. Man. & P. Agt*.Galveston, Tex.
Allen McCoy, *Supt*.....Galveston, Tex.
J. G. Conlon, *M. M.*.....Galveston, Tex.
Geneva, Ithaca & Sayre R. R. *(See Lehigh Val.)*
Georgia R. R. 5 g. 307 m. 42 lo. 1658 cars.
John W. Green, *Gen. Man.*.....Augusta, Ga.
John S. Cook, *M. M.*.....Augusta, Ga.
T. M. Preval, *M. C. B.*.....Augusta, Ga.
Georgia Pacific Ry. (Miss. Div.) 3 g. 43 m. 2 lo. 44 c.
C. M. Bolton, *Supt*.....Greenville, Miss.
W. M. Sutton, *Pur. Agt*.....Greenville, Miss.
Benj. Davis, *M. M.*.....Greenville, Miss.
J. B. Shelton, *M. C. B.*.....Greenville, Miss.
Grand Haven R. R. *(See Chic. & W. Mich.)*
Grand Junction Ry. *(See Midland of Can.)*
G'd Rap., Newaygo & L. S. R. R. *(See Chic. & W. M.)*
Grand Rapids & Indiana. 4-8½ g. 456 m. 32 lo. 1,566 c.
W. O. Hubbard, *Gen. Man.*Grand Rapids, Mich.
W. R. Shelby, *Pur. Agt*.....Grand Rapids, Mich.
S. B. Bradley, *M. M.*.....Grand Rapids, Mich.
No'n Div.: J. M. Metheany, *Supt.*G'nd Rap., Mich.
So'n Div.: P. S. O'Rourke, *Supt*.Fort Wayne, Ind.
Grand Tower & Carbondale. 4-8½ g. 25 m. 6 lo. 357 c.
T. M. Williamson, *Supt. & P. A.*.Gr. Tower, Ill.
High Smith, *M. M. & C. B.*.....Grand Tower, Ill.
Grand Trunk Ry. 4-8½ g. 1,267 m. 404 lo. 9,403 c.
Joseph Hickson, *Gen. Man.*.....Montreal, Can.
Wm. Wainright, *Asst. Man.*.....Montreal, Can.
Gr. Tr. Divs.: W. J. Spicer, *Gen. Supt*.Montreal, Can.
Jno. Taylor, *Gen. Storekeeper*.Montreal, Can.
Herbert Wallis, *Mech. Supt*.....Montreal, Can.
Wm. McWood, *Supt. Car Dep't*.Montreal, Can.
F. R. F. Brown, *Man. Lo. Wks.*Montreal, Can.
J. Haskoni, *Div. M. S.*.....Richmond, P. Q.
F. L. Wanklyn, *Div. M. S.*.....Brockville, Ont.
J. Davis Barnett, *Div. M. S.*...Stratford, Ont.
Chi. & Gr. Trunk Ry. 4-8½ g. 330 m. 56 lo. 1,191 c.
S. R. Callaway, *Gen. Man.*.....Chicago, Ill.
W. H. Pettibone, *Supt*.....Battle Creek, Mich.
A. Judd, *Pur. Agt*.....Fort Gratiot, Mich.
H. Roberts, *Asst. M. S.*.....Fort Huron, Mich.
Great West'n Div.: 4-8½ g. 823 m. 216 lo. 5,039 c.
Chas. Stiff, *Supt*.....Hamilton, Ont.
E. R. Baines, *Pur. Agt*.....Hamilton, Ont.
C. K. Domville, *Loco. Supt*...Hamilton, Ont.
C. F. Hanson, *M. M.*.....London, Ont.
Henry Childs, *Car Supt*.....London, Ont.
Green Bay, Winona & St. Paul R. R.
4-8½ g. 250 m. 19 lo. 590 cars.
Timothy Case, *Gen. Man. & P. A.*Green Bay, Wis.
A. Fenwick, *M. M.*.....Ft. Howard, Wis.
Gulf, Col. & Santa Fé Ry. 4-8½ g. 482 m. 42 lo. 1,237 c.
John Sealy, *Gen. Man.*.....Galveston, Texas.
F. P. Killeen, *Asst. Gen. Man.*Galveston, Texas.
Jno. W. Thorne, *Pur. Agt*.....Galveston, Texas.
G. B. Nichols, *M. M.*.....Galveston, Texas.
W. H. Martin, *M. C. B.*.....Galveston, Texas.
Gulf, Wn Texas & Pac. Ry. 4-8½ g. 68 m. 6 lo. 70 c.
M. D. Monserrate, *Pr. & Supt*...Cuero, Texas.
James Mooney, *M. M.*.....Cuero, Texas.

H

Halifax & Cape Breton Ry. 4-8½ g. 79 m. 9 lo. 208 c.
H. Abbott, *Manager*.....New Glasgow, N. S.
Hannibal & St. Jo. R. R. 4-8½ g. 202 m. 76 lo. 1,860 c.
John B. Carson, *Gen. Man.*.....Hannibal, Mo.
W. R. Woodard, *Supt*.....Hannibal, Mo.
T. L. Combs, *Ch. Eng. & Pur. Agt*..Hannibal, Mo.
Jas. Long, *Supt. M. P. & Car Dep.*Hannibal, Mo.
Hanover Junction, Hanover & Gettysburg R. R.
4-8½ g. 74 m. 9 lo. 106 cars.
H. D. Scott, *Gen. Supt*.....Hanover, Pa.
John J. Bingley, *M. M.*.....Hanover, Pa.
Henry Britcher, *M. C. B.*.....Hanover, Pa.
Harrisburg & Potomac R. R. 4-8½ g. 35 m. 3 lo. 34 c.
H. B. Middleton, *Supt*.....Bolling Springs, Pa.
Hartford & Conn. Val. R. R. 4-8½ g. 45 m. 9 lo. 196 c.
Samuel Babcock, *Pr. & Gen. Man.*Hartford, Ct.
Levi Woodhouse, *Asst. Supt*.....Hartford, Ct.
S. E. Brewer, *M. M. & C. B.*.....Hartford, Conn.
Hartford & Conn. W'n R.R. 4-8½ g. 110 m. 16 lo. 405 c.
John F. Jones, *Supt*.....Hartford, Ct.
J. G. Barlow, *M. M.*.....Hartford, Ct.
Housatonic R. R. 4-8½ g. 126 m. 22 lo. 405 cars.
W. H. Yeomans, *Supt*.....Bridgeport, Ct.
D. S. Draper, *Pur. Agt*.....Bridgeport, Ct.
N. Slingland, *M. M.*.....Falls Village, Ct.
J. J. Ferris, *M. C. B.*.....Falls Village, Ct.
Houston Belt Ry. 4-8½ and 3 gauge 50 miles.
S. L. Werden, *V. P. & Gen. Man.*Houston, Tex.
Houston, East & West Tex. Ry. 3 g. 178 m. 17 lo. 478 c.
Paul Bremond, *Pr. & Pur. Agt*..Houston, Tex.
E. L. Bremond, *Gen. Man.*.....Houston, Tex.
R. G. Duffy, *M. M.*.....Houston, Tex.
C. F. Schelewa, *M. C. B.*.....Houston, Texas.
Houston & Tex. Cen. Ry. 4-8½ g. 750 m. 78 lo. 3,520 c.
G. Jordan, *V. Pr. & Gen. Man.*Houston, Tex.
A. H. Swanson, *Gen. Supt*.....Houston, Tex.
E. S. Larchar, *Pur. Agt*.....New York, N. Y.
L. C. Smith, *Gen. M. M.*.....Houston, Tex.
James McGee, *M. C. B.*.....Houston, Tex.
So. & Wn. Divs.: M. G. Howe, *Supt*.Houston, Tex.
No. & Mi. Divs.: J. A. Quinlan, *Supt*.Dallas, Tex.
C. H. Burns, *Asst. M. M.*.....Corsicana, Tex.
No.-Wn. Div.: Donald Allen, *Supt*.....Waco, Tex.
Humestons & Shenandoah R. R.
4-8½ g. 85 m. 5 lo. 72 cars.
F. O. Wyatt, *Gen. Man.*.....Clarinda, Ia.
M. B. Snyder, *M. M.*.....Clarinda, Ia.
Huntingdon & Br. Top Mt. 4-8½ g. 62 m. 18 lo. 69 c.
Geo. F. Gage, *Gen. Supt*.....Huntingdon, Pa.
Samuel B. Knight, *Pur. Agt*..Philadelphia, Pa.
William Barkla, *M. M.*.....Saxton, Pa.

I

Illinois Central R. R. 4-8½ g. 1,554 m. 294 lo. 6,172 c.
E. T. Jeffery, *Gen. Supt*.....Chicago, Ill.
C. A. Beck, *Asst. Gen. Supt*.....Chicago, Ill.
O. Ott, *Pur. Agt*.....Chicago, Ill.
Henry Schlacks, *Act. S. of Mach.*...Chicago, Ill.
W. B. Snow, *M. M. Car Works*.....Chicago, Ill.
Chic. Div.: T. J. Hudson, *Supt*.....Cairo, Ill.
Wm. Renshaw, *Act. M. M.*.....Chicago, Ill.
Mid. Div.: H. L. Frisbie, *Supt*.....Pontiac, Ill.
Spring Div.: W. Wilkinson, *Supt.*Springfield, Ill.
W. B. McKenna, *M. M.*.....Clinton, Ill.
No'n Div.: J. C. Jacobs, *Supt*.....Amboy, Ill.
J. B. Edams, *M. M.*.....Amboy, Ill.
So. Div.: David Oxley, *M. M.*.....Centralia, Ill.
Ia. Div.: D. W. Parker, *Supt*.....Dubuque, Ia.
Thos. W. Place, *M. M.*.....Waterloo, Ia.
Illinois Midland Ry. 4-8½ g. 176 m. 12 lo. 611 cars.
D. H. Conklin, *Rec. & Gen. Man.*.....Decatur, Ill.
O. E. Grady, *Train Mast*.....Decatur, Ill.
Frank Young, *Pur. Shops*.....Paris, Ill.
Illinois & St. Louis R. R. 4-8½ g. 18 m. 5 lo. 402 c.
C. H. Sharman, *Gen. Supt. & P. A.*Belleville, Ill.
W. O. Hewitt, *M. M.*.....Belleville, Ill.
Charles Rothe, *M. C. B.*.....E. St. Louis Ill.
Indiana, Bloomington & Western Ry.
4-8½ g. 712 m. 64 lo. 3,050 cars.
C. E. Henderson, *Gen. Man.* Indianapolis, Ind.
J. H. Wilson, *Gen. Supt*.....Indianapolis, Ind.
H. C. Norton, *Pur. Agt*.....Indianapolis, Ind.
R. Warren, *Gen. M. M.*.....Indianapolis, Ind.
Peoria Div.: I. H. Wilson, *Supt*..Indianapolis, Ind.
E. Hisenott, *M. M.*.....Paris Ill
St. Louis Div.: I. H. Wilson, *Supt*.....Indpls, Ind.
John King, *M. M.*.....Indianapolis, Ind.
Ohio Div: D. R. Dunis, *Asst. Supt*.Springfield, Ill.
Jos. S. Porter, *M. M.*.....Sandusky, O.
Indiana, Illinois & Iowa R. R. 63 miles.
F. M. Drake, *Gen. Man.*.....Kankakee, Ill.
J. P. Shonts, *Supt*.....Kankakee, Ill.
Indianapolis & Vincennes R. R. *(See Penna. Co.)*
International Bridge Ry. 4-8½ g. 846 m. 153 lo. 4,500 cars.
David Pottinger, *Chief Supt*.....Moncton, N. B.
T. V. Cooke, *Gen. Storekeeper*..Moncton, N. B.
H. A. Whitney, *Mech. Supt*.....Moncton, N. B.
Ewd. Shaffer, *M. C. B.*.....Moncton, N. B.
Monc. Div.; J. E. Price, *Supt*..Cambellton, N. B.
Hal. & C. Div.: Jas. Coleman, *Supt*.Truro, N. B.
Levis Div.: A. McDonald, *Supt*.Riviere du Loup, Q.
International Ry. 4-8½ g. 60 m. 2 lo. 12 cars.
D. E. Barnes, *Supt*.....Sherbrooke, Que.
(See Mo. Pac. Ry.)
Iron Mountain & Helena R. R. 4-8½ g. 57 m. 2 lo. 14 c.
Wm. Hogan, *Pres. & Gen. Man.*.....Helena, Ark.
D. Stillinger, *Supt*.....Helena, Ark.
F. M. Green, *Pur. Agt*.....Helena, Ark.
Wm. Summers, *M. C. B.*.....Helena, Ark.
Ithaca, Auburn & Western Ry. 4-8½ g. 38 m.
Fred T. Peet, *Supt*.....Auburn, N. Y.
Ira Dunning, *M. M.*.....Auburn, N. Y.

J

Jacksonville So.-E'n R. R. 4-8½ g. 54 m. 5 lo. 68 c.
E. S. Greenleaf, *Supt*.....Jacksonville, Ill.
Ira Petrie, *M. M.*.....Jacksonville, Ill.
Jacksonv., Pensacola & Mob. *(See Fla. Ce-t. & W.)*
Jamesville & Washington. 4-8½ g. 23 m. 3 lo. 6 c.
A. Fisher, *Manager*.....Dymond City, N. C.
J. E. Lordley, *M. M. & C. B.*..Dymond City, N. C.
Jeffersonv'l, Madison & Indpls. R. R. 4-8½ g. 38 m.
Jersey City & Albany R. R. 4-8½ g. 38 m.
J. W. McCulloh, *Manager*.....Jersey City, N. J.
Junction & Breakwater; Breakwater & Frankford; and Worcester R. Rs. 4-8½ g. 101 m. 6 l. 133 c.
J. & B. Rd.: Thos. Groome, *Supt*.....Lewes, Del.
Geo. Messick, *M. M.*.....Lewes, Del.
W. H. Virden, *M. C. B.*.....Lewes, Del.
B. & F. and W. Rds.: J. L. Mapes, *St.* Berlin, Md.

K

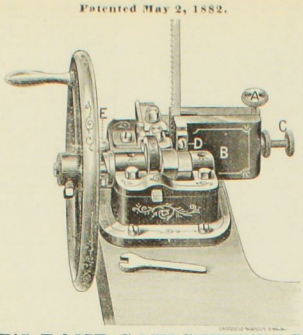
Kansas Central R. R. *(See Union Pacific.)*
Kansas Cy, Lawrence & So. Kan. 4-8½ g. 396 m. 78 c.
C. C. Wheeler, *Gen. Man.*.....Topeka, Kan.
J. L. Barnes, *Supt*.....Lawrence, Kan.
F. M. Smith, *Pur. Agt*.....Topeka, Kan.
T. D. Volk, *M. M.*.....Ottawa, Kan.
Kansas City, Fort Scott & Gulf R. R. 4-8½ g.
Geo. H. Nettleton, *Gen. Man.*.Kansas City, Mo.
L. W. Towne, *Gen. Supt*.....Kansas City, Mo.
H. P. Bope, *Pur. Agt*.....Kansas City, Mo.
J. S. McCrum, *M. M.*.....Kansas City, Mo.
A. N. Montier, *M. C. B.*.....Kansas City, Mo.
Kansas City, Joseph & Council Bluffs; and St. Jo. & Des Moines R. Rs. 4-8½ g. 368m. 38 lo. 1,148 cars.
J. F. Barnard, *Gen. Supt. & P. A.*St. Joseph, Mo.
A. C. Chase, *M. M.*.....St. Joseph, Mo.
Thos. Aylesbury, *G. For. Car Dep.*St. Joseph, Mo.
Kendall & Eldred R. R. *(See Del., Lack. & W. Rrs.)*
Kent Co. Ry. Kent Bay Rds. 4-8½ g. 50 m. 2 lo. 13 c.
Fred Gerker, *Gen. Man.*.....Chestertown, Md.
Kentucky Central R. R. 4-9 g. 150 m. 30 lo. 1,000 c.
A. H. Watts, *F. of Mach.*.....Covington, Ky.
J. L. Hackaburn, *M. C. B.*.....Covington, Ky.
Kentucky & North Atlantic Ry. 3 g. 23 m. 3 lo. 52 c.
Geo. B. Harper, *Supt. & P. A.*.Mt. Sterling, Ky.
S. P. Hatfield, *M. M.*.....Mt. Sterling, Ky.
(See Olean, B. & W.)
Kingston & Pembroke Ry. 4-8½ g. 65 m. 4 lo. 76 c.
B. W. Folger, *Gen. Man.*.....Kingston, Ont.
C. Gildersleeve, *Pur. Agt*.....Kingston, Ont.
Geo. Becker, *M. M.*.....Kingston, Ont.
Knox & Lincoln R. R. 4-8½ g. 49 m. 5 lo. 96 cars.
C. A. Coombs, *Supt*.....Bath, Me.
Wm. A. Field, *M. M.*.....Bath, Me.
H. D. Turner, *M. C. B.*.....Bath, Me.
Knoxville & Augusta R. R. 4-6 g. 16 m. 2 lo. 34 cars.
J. M. Hood, *Supt*.....Marysville, Tenn.
J. M. Hood, *Pur. Agt*.....Marysville, Tenn.

L

Lake Erie & Western Ry. 4-8½ g. 388 m. 43 lo. 1,520 c.
E. H. Waldron, *Gen. Man.*.....La Fayette, Ind.
E. H. Andress, *Pur. Agt*.....La Fayette, Ind.
H. L. Coonley, *Supt. of Equipment*.....Lima, O.
D. S. Hill, *Gen. Supt*.....Sandusky, O.
Lake Shore & Mich. So'n Ry.
4-6½ g. 1,243 m. 546 lo. 17,115 cars.
John Newell, *Gen. Man.*.....Cleveland, O
P. H. Wright, *Gen. Supt*.....Cleveland, O
A. C. Armstrong, *Pur. Agt*.....Cleveland, O
James Sedgley, *Gen. M. M.*.....Cleveland, O
John Ryan, *Gen. M. C. B.*.....Cleveland, O
Buffalo Div.: C. B. Couch, *Supt*.....Cleveland, O.
J. S. Graham, *M. M.*.....Buffalo, N. Y.
A. C. Robson, *M. C. B.*.....Buffalo, N. Y.
Frank. Div.: G. H. McIntire, *Supt*.Stoneboro, Pa.
Erie Div.: C. B. Couch, *Supt*.....Cleveland, O.
L. O. Bassett, *M. M.*.....Cleveland, O.
J. Withycombe, *M. C. B.*.....Cleveland, O.
Toledo Div.: Thos. Flesher, *Jr., Supt*.Cleveland, O.
W. H. Yeomans, *Supt*.....Norwalk, O.
W. O. Smith, *M. C. B.*.....Norwalk, O.
Mich. Div.: J. E. Curtis, *Supt*.....Toledo, O
Det. Div.: F. Charlesworth, *Supt*.Detroit, Mich.
Lansing Div.: W. H. Caniff, *Supt*.Lansing, Mich.
Western Div.: J. H. Parsons, *Supt*.....Chicago, Ill.
G. W. Stevens, *M. M.*(M.S.Divs.) Elkhart, Ind.
Frank O. Bray, *M. C. B.*.....Adrian, Mich.
Ft. Wayne Br. W. H. Caniff, *Supt*.Jackson, Mich.
Lebanon Springs R. R. 4-8½ g.
W. C. Alatyne, *Manager*.....Albany, N. Y.
J. K. Hotaling, *Pur. Agt*.....Albany, N. Y.
Geo. Moffett, *M. M.*.....Chatham, N. Y.
Lehigh Valley R. R. 4-8½ g. 545 m. 321 lo. 33,817 c.
H. S. Goodwin, *Gen. Supt*.....Bethlehem, Pa.
L. Chisholm, *Pur. Agt*.....Philadelphia, Pa.
John S. Lentz, *M. C. B.*.....Packerton, Pa.
N. J. Div.: Jas. Donnelly, *Supt*.New York, N. Y.
John Lentz, *M. M.*.....So. Easton, Pa.
Coal Rds.: J. I. Blakeslee, *Supt*.Mauch Chunk, Pa.
P. Hofecker, *M. M.*.....Weatherly, Pa.
John Campbell, *M. M.*.....Delano, Pa.
B. M. Div.: A. G. Brodhead, *S.* Manch Chunk, Pa
D. Clark, *M. M.*.....Bethlehem, Pa.
Wy. Div.: A. Mitchell, *S. & M. M.*Wilkesbarre, Pa.
Pa. & N. Y.: and Geneva, Ithaca & Sayre R. Rs.
Wm. Stevens, *Supt*.....Waverley, Pa.
J. N. Weaver, *M. M.*.....Waverley, Pa.
Ligonier Valley R. R. 4-9 g. 11 m. 2 lo. 22 cars.
Thos. A. Mellon, *Gen. Manager*.....Pittsburg, Pa.
Geo. Senft, *Supt. & P. Agt*.....Latrobe, Pa.
Little Rock, Miss. River & Texas Ry.
4-8½ g. 100 m. 12 lo. 200 cars.
J. A. Woodson, *G. S. & P. A.* Little Rock, Ark.
F. Hufsmith, *M. M. & C. B.*..Arkansas City, Ark.
Little Rock & Fort Smith 4-8½ g. 168 m. 13 lo. 533 c.
T. Hartman, *Gen. Supt*.....Little Rock, Ark.
James Ehlin, *M. M.*.....Argenta, Ark
James Malone, *M. C. B.*.....Argenta, Ark

Long Island R. R. 4-8½ g. 325 m. 79 lo. 740 cars.
I. D. Barton, *Supt*.....*Long Island City, N. Y.*
Benj. Norton, *Pur. Agt*.Long Island City, N. Y
C. A. Thompson, *M. M. & C. B.*.....do.
Louis., Evans. & St. L. Ry. 4-8½ g. 254 m. 34 lo. 1,032 c.
Webster Snyder, *Gen. Man.*.....Louisville, Ky.
W. H. Field, *Pur. Agt*.....Louisville, Ky.
F. M. Mast, *M. M.*.....Evansville, Ind.
Louisville, New Albany & Chicago Ry.
4-8½ g. 470 miles 50 lo. 3,700 cars.
John MacLeod, *Gen. Supt*.....Louisville, Ky.
H. O. Nourse, *Pur. Agt*.....Louisville, Ky.
Josiah Bettis, *M. M. & C. B.*..New Albany, Ind.
Louisville & Nashville R. R.
5 g. 2,090 m. 367 lo. 11,353 cars.
Fred. de Funiak, *Gen. Man.*.....Louisville, Ky
G. C. Breed, *Asst. Gen. Man.*.....Louisville, Ky.
D. W. C. Rowland, *Gen. Supt. Trans.*Louisville, Ky.
Reuben Wells, *Supt. Mach.*.....Louisville, Ky
Louisv. Div.; and Louisv. Cin. & Lex. Ry. (Cin. Div.)
J. G. Metcalf, *Supt. Trans*.....Louisville, Ky.
F. Leeds, *M. M.* (Lo. Div.).....Louisville, Ky.
J. W. Luttrell, *M. M.* (Cin. Div.) Louisville, Ky.
W. P. Pike, *M. M.* (2d & C. Div.).Bowling Green, Ky.
Nash. & D. Div.: J. Geddes, *Supt*.Nashville, Tenn.
W. H. Thomas, *M. M.*.....Nashville, Tenn.
S. & N. A. Div.: E. Marsh, *Supt*.Birmingham, Ala.
C. W. White, *M. M.*.....Birmingham, Ala.
Mob. & M. N. Div: Pens. & Sel.; S. & Mont. R.Rs.:
M. S. Belknap, *Supt*.....Montgomery, Ala.
J. N. Hall, *M. M.*

Patented May 2, 1882.

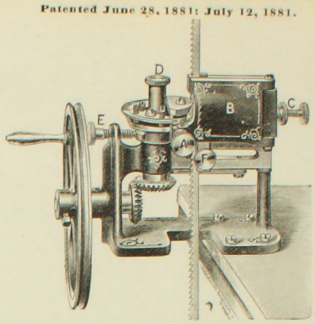


AMESBURY'S BAND SAW SETTING MACHINE.

Will Set Saws from ⅛ Inch to 2 Inches Wide Accurately at the Rate of 300 Teeth per Minute.

This engraving represents our new Band Saw Setting Machine. It is designed and constructed upon entirely new principles, and embodies all the good features of hand-work in combination with the speed and regularity of machine-work. The users of band saws have long felt the need of a machine that would hold a narrow saw in a rigid position and set the teeth without straining the blade; and in response to inquiries from many of our leading manufacturers, we have perfected a machine that will set the teeth on any band saw without in any manner affecting the blade. It is arranged to work by an easy, uniform crank motion, and when the tooth to be set is fed into position, the blade is firmly locked between the steel jaws of a vise, and remains immovable while the tooth is set to any degree required. As the crank goes forward, the blade is released, when the next tooth is fed up to the dies, the blade again locked in vise, and this tooth set in the opposite direction. All these movements are automatic, and can be carried on at a speed of 300 teeth per minute. The feeder picks up *only the tooth that is to be set*, consequently each tooth is fed to its proper position, *regardless of their irregularity*. No further expense is required outside of the machine, as the band saw is simply hung up over the machine on a wooden bracket, and the lower part left pendent near the floor. **Price, $20.** Send for Circulars and Testimonials.

Patented June 28, 1881; July 12, 1881.



AMESBURY'S BAND SAW FILING MACHINE.

Will Save Its Cost in a Few Weeks.

Any boy that can turn a crank can file a band saw in from five to ten minutes, more accurately than an expert filer can do the same by hand in one hour. Keeps the teeth even and level, and enables the saw to do more and better work with much less strain. Pronounced by users to be the best labor-saving machine ever introduced.

First Premium and Diploma of St. Louis Agricultural and Mechanical Association, 1881, Awarded for

BEST BAND SAWFILING MACHINE.

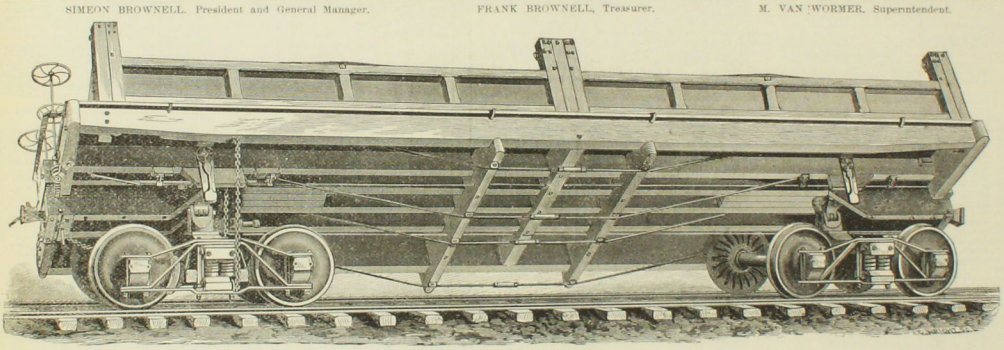
Is sold at a price within the reach of every one using a band saw. *Reduced Price List.*—Net price, in cloth of 20 files, $25; thin, corner and facing files, per dozen, $1.20; thick beveled files, per dozen, $1.80 Terms strictly cash.

Send for Catalogue and Testimonials.

GOODELL & WATERS, Wood-Working Machinery, 3,101 Chestnut St., Philadelphia, Pa.

THE U. S. CAR CO.'S SCREW LEVER DUMP AND COAL CAR.

SIMEON BROWNELL, President and General Manager. FRANK BROWNELL, Treasurer. M. VAN WORMER, Superintendent.

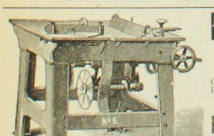


(M. VAN WORMER PATENTS.)

This car has a capacity of eighteen to twenty tons, and can be handled by one man, discharging its load instantly. The device can be applied to flat and grain cars. The car is under perfect control at all times, and can be held at any elevation or dumped suddenly if desired. For construction trains, cars with this device would be invaluable. The mechanism is strong, simple and durable. The following railroads and car builders are building cars with this screw lever attachment, viz.:

Union Pacific Railway Co.
Lehigh Valley Railroad.
Main Central Railroad Co.
Billmeyer & Small Co., York, Pa.
Northern Pacific Railroad Co.
Joliet Steel Co., of Chicago.
Columbus, Hocking Valley & Toledo Railway.
Wells & French Car Co., Chicago.
Cleveland Rolling Mills Co., Cleveland.
John L. Gill, Jr., Car Co., Pittsburgh.
Rock Island & Mercer County Railroad.
Ontario Car Co., London, Ontario Canada.

UNITED STATES CAR COMPANY, 48 CONGRESS STREET, BOSTON, MASS.



No. 3 Wardwell Saw Bench.

ROLLSTONE MACHINE CO.

Wardwell Saw Benches a specialty.

These machines are in use in the car-shops of the Penn. R. R., B. & O., P. W. & B. B. & A. F. R., Mich. Central, and some fifty other of the largest shops in the country

Also, A HEAVY BAND SAW FOR CAR WORK.

ROTARY, STATIONARY, BED & BUZZ PLANERS,

And a large number of other machines for car work.

We are dealers in all kinds of Second-Hand Machinery, Engines, Boilers, Iron and Wood-Working Machinery.

Do not buy until you send for new descriptive list, stating just what you want inclosing stamp.

ROLLSTONE MACHINE CO., 131 WATER ST., FITCHBURG, MASS.

DYNAMIC TALLOW

a economical tallow wholly divested of the scrap, wastes and fat-cells, sometimes amounting to **20 per cent. of the mass** that goes over into the kettles in "rendering out" the crude tallow as it comes from the butcher's blade. By our process this destructive corrosive matter is **all taken out** and there remains only

Pure Beef's Fat Destitute of Acids.

THE BEST VALUE TALLOW.

DYNAMIC TALLOW.

The advantage of such a product for cylinder lubrication is obvious.

Your Orders Invited. Satisfaction Guaranteed.

INLAND OIL COMPANY,
CINCINNATI, O.

GROUND TRIPOLI,

THE BEST THING KNOWN FOR CLEANING AND POLISHING THE

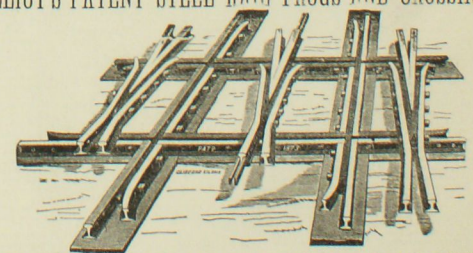
METAL WORK on LOCOMOTIVES and CARS.

That manufactured by us is warranted not to scratch, and has been used for several years by the principal Railroad Companies and by Fire Departments generally, and is highly recommended by them.

Send for sample.

GEORGIA MINING & MANUFACTURING CO.,
MINES AND MILL, DALTON, Ga. 134 WATER STREET, NEW YORK.

ELLIOT'S PATENT STEEL RAIL, FROGS AND CROSSINGS.



These Frogs and Crossings are made of steel rail, combined with a wrought-iron frame, and bound together transversely with strong bolts, which gives them great strength and durability without destroying their elasticity. They are connected at all ends by Fish-Plate Joints, and lie on the same tie surface as the running rail without any cutting of ties, thus saving a great deal of time and labor in putting in place on track.

Manufactured by H. & H. ELLIOT
East St. Louis, Ill.

W. H. Harris, *M. M.*.....De Soto, Mo.
J. J. Frey, *Asst. Supt.*.....Little Rock, Ark.
R. M. Richardson, *M. M. & C. B.*.....do.
(3) Inter. & Gr't No'n R. R. 4-8½ g. 77½ m. 45 lo.632 c.
Jos. Herrin, *Supt.*.....Palestine, Tex.
R. H. Johnson, *M. M.*.....Palestine, Tex.
(4) Texas & Pac. Ry. 4-8½ g. 1,482 m. 120 lo. 1,106 c.
E. L. Dudley, *Supt.*.....Marshall, Tex.
E. E. Carver, *Asst. M. C. B.*.....Marshall, Tex.
W. Garrison, *M. M.*.....Marshall, Tex.
Perry Stevens, *M. M.*.....Texarkana, Ark.
Rio Gr. Div. c. o. O.Clinton, *Supt.*Big Spring, Tex.
W. H. Reilly, *Asst. G. M. M.*Fort Worth, Tex.
New Or. Div. : C. Fleming, *Supt.*New Orleans, La.
Mobile & Ala. Grand Trunk R. R. 5 g. 59 m. 2 lo. 230 c.
Wm. H. Pratt, *Trustee*.....Mobile, Ala.
Mobile & Girard R. R. 5 g. 84 m. 7 lo. 112 cars.
W. L. Clark, *Gen. Supt.*.....Columbus, Ga.
J. C. Albrecht, *M. M.*.....Colum'bus, Ga.
A. J. Nix, *M. C. B.*.....Columbus, Ga.
Mobile & Ohio R. R. 5 g. 528 m. 75 lo. 1,350 cars.
A. L. Rives, *V. Pr. & Gen. Man.*.....Mobile, Ala.
R. H. Briggs, *Gen. M. M.*.....Whistler, Ala.
J. T. Heath, *M. C. B.*.....Whistler, Ala.
So'n Div., I. G. Motley, *Supt.*.....Mobile, Ala.
John Fitzgerald, *M. M.*.....Macon, Miss.
No'n Div. : E. S. Horsford, *Supt.*.....Jackson, Tenn.
M. T. Carson, *M. M.*.....Jackson, Tenn.
Mobile & Spring Hill R. R. 5 g. 8 m. 10 lo. 90 cars.
F. Ingate, *Supt.*.....Mobile, Ala.
Mont Alto R. R. 4-9 g. 21 m. 2 lo. 3 cars.
G. B. Weistling, *Supt. & P. A.*.....Mont Alto, Pa.
Montpelier & Wells Riv. R. R. 4-8½ g. 38 m. 3 lo. 76 c.
Supt......Montpelier, Vt.
Morgan's Louisiana & Tex. R. R. 4-8½ g. 160 m.
G. Pandeley, *Supt.*.....New Orleans, La.
C. Trumpy, *Pur. Agt.*.....New Orleans, La.
N. Tilton, *M. M.*.....Algiers, La.
Wm. O'Brien, *M. C. B.*.....Algiers, La.
Muncy Creek Ry. 4-8½ g. 10 m.
Benj. G. Welch, *Rec. & P. Agt.*Hughesville, Pa.
J. V. Chamberlain, *Supt. & M. M.*.....do.

N

Nashville, Chattanooga & St. Louis R'y.
5 g. 508 miles 87 lo. 1,979 cars.
J. W. Thomas, *G. Supt. & P. Agt.*Nashville, Tenn.
M. J. C. Wrenne, *Supt.*.....Nashville, Tenn.
James Cullen, *M. M. & C. B.*.....Nashville, Tenn.
Natchez, Jackson & Col. R. R. 3-6 g. 98 m. 7 lo. 72 c.
Belton Mickle, *Supt.*.....Natchez, Miss.
Naugatuck R. R. 4-8½ g. 61 miles, 14 lo. 384 cars.
Geo. W. Beach, *Supt.*.....Waterbury, Ct.
Henry Hanford, *M. M.*.....Bridgeport, Ct.
Geo. W. Gray, *M. C. B.*.....Bridgeport, Ct.
Nevada Central R. R. .....(*See Union Pac.*)
Nevada County N. G. R. R. 3 g. 23 m. 3 lo. 46 cars.
John F. Kidder, *Supt.*.....Grass Valley, Cal.
Jas. McCormick, *M. M. & C. B.*Grass Valley, Cal.
New Brunswick Ry. 4-8½ g. 194 m. 12 lo. 266 cars.
E. E. Burpee, *Gen. Man.*.....Gibson, N. B.
Henry Osborn, *Gen. Supt.*.....Gibson, N. B.
Alfred Seely, *Pur. Agt.*.....Gibson, N. B.
Jesse Mathews, *M. M.*.....Gibson, N. B.
T. N. Burpee, *M. C. B.*.....Gibson, N. B.
New Brunswick & Can. Ry. 4-8½ g. 127 m. 12 lo. 184c.
Henry Osborn, *G. M. & P. A.*St. Andrew's, N. B.
John Stewart, *Supt.*.....St. Stephen, N. B.
Thos. Armstrong, *M. M.*.....St. Andrew's, N. B.
G. Houlton, *M. C. B.*.....St. Andrew's, N. B.
New Haven & Derby R. R. 4-8½ g. 13 m. 3 lo. 58 c.
E. S. Quintard, *Supt.*.....New Haven, Conn.
J. M. Whitlock, *M. M. & C. B.*New Haven, Conn.
New Haven & No'mpton. 4-8½ g. 135 m. 26 lo. 572 c.
C. A. Goodnow, *Supt.*.....New Haven, Ct.
C. N. Yeamans, *Pur. Agt*.....New Haven, Ct.
Henry Fox, *M. M.*.....New Haven, Ct.
John Sweeny, *M. C. B.*.....New Haven, Ct.
New Jersey & New York Ry. 4-6 g. 43 m. 2 lo. 2 cars.
J. D. Hasbrouck, *Gen. Man*.Jersey City, N. J.
J. S. Drake, *Supt. & M. M.*.....do.
J. M. Whitlock, *M. M. & C. B.*New Haven, Conn.
New Jersey Southern Ry. .....(*See Central, N. J.*)
New London Northern R. R. .....(*See Central Ver.*)
New Orleans Pacific Ry. 5 g. 85 m. 10 lo. 200 cars.
H. S. Morse, *Supt.*.....New Orleans, La.
E. R. Smith, *M. M. & C. B.*.....New Orleans, La.
N. Y. Central & Hudson River R.R.
4-8½ g. 962 m. 676 lo. 22 530 cars.
J. M. Toucey, *Gen. Supt.*.....New York, N. Y.
R. C. Moore, *Pur. Agt*.....New York, N. Y.
Wm. Buchanan, *Supt. M. P.*.....New York, N. Y.
L. Garey, *Supt. Car Dep.*.....New York, N. Y.
N. Y. & Har. Div. : D. M. Bissell, *Supt.*.....do.
P. McQ. Gibson, *M. M.*.....New York, N. Y.
C. B. Garey, *M. C. B.*.....Morrisania, N. Y.
Hud. Riv. Div. : C. M. Bissell, *Supt.N.*Albany, N. Y.
Peter Smith, *M. C. B.*.....New York, N. Y.
E'n Div. : Zenas C. Pryest, *Supt.*.....Utica, N. Y.
G. B. Van Vorst, *M. M.*.....West Albany, N. Y.
D. Holt, *M. C. B.*.....West Albany, N. Y.
W'n Div. : Geo. H. Burrows, *Supt.*Rochester, N. Y.
S. L. White, *M. M.*.....Syracuse, N. Y.
Amos Gould, *M. M.*.....E. Buffalo, N. Y.
E. A. Olmstead, *M. C. B.*.....E. Buffalo, N. Y.
C. H. Burchard, *M. C. B.*.....E. Rochester, N. Y.
Rd. Donaby, *M. C. B.*.....Niagara Falls, N. Y.
N. Y. Chic. & St. L. Ry. 4-8½ g. 220 m. 110 lo. 4,858 c.
Lewis Williams, *Gen. Man.*.....Cleveland, O.
E. Dwight, *Gen. Supt.*.....Cleveland, O.
Jno. W. Dougherty, *Pur. Agt.*.....Cleveland, O.
Ross Kells, *Supt. M. P.*.....Cleveland, O.
Eas'n Div. : G. H. Kimball, *Supt.*.....Cleveland, O.
E. L. Miller, *M. M.*.....Cleveland, O.
West'n Div. : E. E. Dwight, *Supt.*.....Chicago, Ill.
F. P. Boatman, *M. M.*.....Bellevue, O.
New York City & Northern. 4-8½ g. 52 m. 7 lo. 91 c.
Frank S. Gannon, *Gen. Supt.*High Bridge, N. Y.
John McGill, *Gen. For.*.....High Bridge, N. Y.
New York, Lake Erie & Western R. R.
4-8½ g. 1,020 m. 508 loco. 30,500 cars.
Robt. Harris, *V. Pr. & G. Man.*New York, N. Y.
S. S. Bowen, *Gen. Supt.*.....New York, N. Y.
J. J. Hardenburg, *Pur. Agt.*.....New York, N. Y.
F. M. Wilder, *Supt. M. P. & M.*.....Susqueh'a Pa.
Erie Div. : E. O. Hill, *Supt.*.....Jersey City, N. J.
J. H. Vreeland, *M. M.*.....Jersey City, N. J.
J. N. Mileham, *M. C. B.*.....Jersey City, N. J.
Del. Div. : W. J. Murphy, *Supt.*.....Port Jervis, N. Y.
J. Van Vechten, *M. M. & C. B.*Pt. Jervis, N. Y.
Susq. Div. : R. B. Cable, *Supt.*.....Elmira, N. Y.
W. Shoebotham, *M. M.*.....Susquehanna, Pa.
D. B. Goodell, *M. C. B.*.....Elmira, N. Y.
Buf. & R. Divs. : Chas. Neilson, *Supt.*.....do.
G. B. Ross, *M. M.*.....Buffalo, N. Y.
M. Wilder, *M. C. B.*.....Buffalo, N. Y.
B. & S. W. Div. : C. A. Brunn, *Supt.*.....do.
W. & Div. : W. B. Coffin, *Supt.*.....Hornellsville, N. Y.
R. Gunn, *M. M.*.....Hornellsville, N. Y.
New York, New Haven & Hartford R. R.
4-8½ g. 205 m. 102 lo. 2,416 cars.
E. M. Reed, *V. P. & Gen. Man.*.....New Haven, Ct.
H. N. Dowd, *Pur. Agt*.....New Haven, Ct.
N. Y. & N. H. Div. : W. H. Stevenson, *Supt.*.....N. Y.
Shore Div. : O. M. Shepard *Supt.*.....N. Haven, Ct.
H. Ketteridorf, *Supt. M. P.*.....New Haven, Ct.
Jas. Denver, *M. C. B.*.....New Haven, Ct.
Hart. Div. : C. S. Davidson, *Supt.*.....Hartford, Ct.
Nelson Henry, *Gen. Supt. M. P. & M. C. B.*.....do.
New York, Ontario & Western Ry.
4-8½ g. 345 m. 79 lo. 1,530 cars.
Jas. E. Childs, *Gen. Supt.*.....New York, N. Y.
I. W. Fowler, *Pur. Agt.*.....Middletown, N. Y.
Edw. Minshall, *M. M. & C. B.*M. Middletown, N. Y.
Mid. Div. : N. B. Hankins, *Sup.*.....Middletown, N. Y.
No'n Div. : C. W. Lanpher, *Supt.*.....Norwich, N. Y.
So. Div. : E. Canfield, *Supt.*.....Tappan, N. Y.
New York, Pennsylvania & Ohio R. R.
4-8½ g. 564 m. 218 lo. 7,394 cars.
J. M. Ferris, *Gen. Man.*.....Cleveland, Ohio.
J. H. Holway, *Pur. Agt.*.....Cleveland, Ohio.
Wm. Fuller, *Gen. M. M. & C. B.*.....Cleveland, O.
S. V. Smith, *Asst. Gen. M. C. B.*.....Kent, Ohio.
E'n Div. : A. L. Dunbar, *Supt.*.....Meadville, Pa.
J. A. Cooper, *M. M.*.....Meadville, Pa.
D. S. Dockstader, *M. C. Rep.*.....Meadville, Pa.
J. T. Fosdick, *For. Car Rep.*Salamanca, N. Y.
W'n Div. : J. W. Alsop, *Supt.*.....Galion, O.
Wm Hill, *M. M.*.....Galion, O.
J. W. Holmes, *For. Car Rep.*.....Galion, O.
Geo. Wilson, *For. Car Rep.*.....Dayton, Ohio.
Maho'g Div. : N. F. Wood, *Supt.*.....Cleveland, O.
N. Wright, *M. M.*.....Cleveland, O.
C. N. Thorp, *M. C. Rep.*.....Cleveland. O.
New York, Providence & Boston R. R.
4-8½ g. 72 m. 29 lo. 436 cars.
J. B. Gardner, *Supt.*.....Providence, R. I.
Giles F. Ward, *Pur. Agt.*.....Stonington, Conn.
J. D. Anderson, *M. M. & C. B.*Providence, R. I.
N. Y., Susquehanna & W'n. 4-9 g. 13.5 m. 28 lo. 925 c.
H. M. Britton, *Gen. M. & P. A.*New York, N. Y.
G. A. Hill, *M. M. & C. B.*.....Wortendyke, N. J.
New York, West Shore & Buffalo Ry.
Chas. Paine, *Gen. Man.*.....New York, N. Y.
Horace Porter, *V. P. & M. P.*.....New York, N. Y.
Walkill Ry. G. H. Graves, *Supt.*.....Rondout, N. Y.
New York, Woodhaven & Rockaway R. R.
4-8½ g. 16 m. 4 lo. 101 cars.
J. M. Lunt, *Supt. & P. Agt.*.....Hunter's Pt., L. I.
W. B. Turner, *M. M.*.....Hunter's Point, L. I.
N. Y. & Greenwood Lake Ry. 4-8½ g. 44 m. 8 lo. 53 c.
J. H. Tinney, *Supt.*.....Jersey City, N. J.
J. A. Hardenburg, *Pur. Agt.*.....New York, N. Y.
G. A. Hill, *M. M.*.....Pompton, N. J.
N. Y. & Manhattan Beach Ry. 3 g. 23 m. 12 lo. 128 c.
D. C. Corbin, *Man. Dir.*.....New York, N. Y.
Fairhurst, *Jr., Gen. Man.*.....Greenpoint, L. I.
New York & New England R. R.
4-8½ g. 403 m. 127 lo. 3,326 cars.
S. M. Felton, *Jr., Gen. Man.*.....Boston, Mass.
W. W. McKim, *Pur. Agt*.....Boston, Mass.
A. K. Mansfield, *Supt. M. P.*.....Boston, Mass.
D. F. Wright, *M. M.*.....Norwood, Mass.
H. B. Barker, *Gen. Fore.*.....Norwood, Mass.
East Div. : C. F. Bent, *Supt.*.....Boston, Mass.
C. B. Moore, *M. M.*.....Boston, Mass.
Nor. Div. : P. St. M. Andrews, *Supt.*.....Norwich, Ct.
W. S. Shiverick, *M. M.*.....Norwich, Ct.
Prov. Div. : L. W. Palmer, *Supt.*.....Providence, R. I.
Hfd. Div. : E. Holbrook, *Supt.*.....Hartford, Ct.
R. H. Armstrong, *M. M.*.....Hartford, Ct.
Newburg, Dutchess & Conn. R. R. 4-8½ g. 58 miles.
C. L. Kimball, *Supt.*.....Matteawan, N. Y.
W. G. Wilson, *M. M. & C. B.*.....do.
Norfolk & Western R. R. 5 g. 428 m. 82 lo. 1,220 c.
Henry Fink, *2d V. Pr. & Gen. Man.*Lynchb'g, Va.
W. C. De Armond, *Pur. Agt.*.....Philadelphia, Pa.
C. Blackwell, *Supt. M. P.*.....Roanoke, Va.
West'n Div. : Frank Huger, *Supt.*.....Lynchburg, Va.
F. Fowler, *M. M.*.....Lynchburg, Va.
East'n Div. : N. M. Osborne, *Supt.*.....Petersburg, Va.
J. T. Robinett, *M. M. & C. B.*.....Petersburg, Va.
North-Eastern R. R. of Ga. 5 g. 40 m. 2 lo. 50 cars.
H. R. Bernard, *Supt.*.....Athens, Ga.
North-Eastern R. R. (S. C.) .....(*See Wil. & Wel.*
North Pacific R. R. 3 g. 84 m. 12 lo. 2,350 cars.
David Nye, *Gen. Supt.*.....San Rafael, Cal.
W. F. Russell, *Pur. Agt*.....San Francisco, Cal.
J. Fowler, *M. M.*.....Sancelito Cal.
North Shore .....
A. Davis, *Gen. Man.*.....Quebec, Can.
Northern (N. H.), and Concord & Claremont Rys.
4-8½ g. 173 m. 25 lo. 569 cars.
Geo. E. Todd, *Supt.*.....Concord, N. H.
Ed. Studley, *M. M. & C. B. & Pur. Agt.*.....do.
Northern (N. J.) R. R. .....(*See N. Y., L. E. & W'n.*)
Northern Central Ry. .....(*See Penna. P. R. R.*)
North'n Pacific R. R. 4-8½ g. 1,193 m. 104 lo. 3,089 c.
Herman Haupt, *Gen. Man.*.....St. Paul, Minn.
John H. Ames, *Pur. Agt.*.....St. Paul, Minn.
Geo. W. Cross, *Supt. Trans.*.....St. Paul, Minn.
Geo. W. Cushing, *Supt. M. P., M. & R. S.*.....do.
St. P. & Minn. Divs. : R. McHugh, *Supt.*.....do.
H. J. Small, *A. S. Mach.*(E. D.) Brainerd, Minn.
Frank Howard, *M. C. B.*.....Brainerd, Minn.
Dakota Div. : J. T. Odell, *Supt.*.....Fargo, Dak.
A. Rupert, *M. M.*.....Fargo, Dak.
Mo. Riv. : D. R. Taylor, *Supt.*.....Mandan, Dak.
E. F. Doran, *M. M.*.....Mandan, Dak.
Yell'st'e Div. : S. R. Ainslie, *Supt.*Glendive, Mont.
S. L. Bean, *M. M.*.....Glendive, Mont.
G. S. La Bar, *M. M.*.....Billings, Mont.
(2) Western Div. : J. W. Sprague, *Gen. Supt.*; and
Otis Sprague, *Supt.*.....New Tacoma, W. T.
H. D. Sanborn, *Pur. Agt.*.....Portland, Ore.
W. T. Small, *A. S. Mach.*(W. D.)Sprague, W. T.
F. C. Ford, *M. M.*.....New Tacoma, W. T.
S. Graham, *M. C. B.*.....New Tacoma, W. T.
Pend d'Ore Div. : .....
H. W. Fairweather, *Supt.*.....Ainsworth, W. T.
J. H. Hall, *M. M.*.....Ainsworth, W. T.
Northern & North-W'n Ry. 5-6 & 4-8½ g. 50 lo. 1,033 c.
James Webster, *Supt.*.....Toronto, Can.
W. C. Schroeder, *Pur. Agt.*.....Toronto, Can.
P. Clarke, *M. M.*.....Toronto. Can.

O

Ogdensburg & Lake Champlain R. R.
4-8½ g. 122 m. 33 lo. 1,160 cars.
A. A. Gaddis, *Gen. Man.*.....Ogdensburg, N. Y.
Abr. Klobs, *Supt. & M. M.*.....Malone, N. Y.
Ohio Central R. R. 4-8½ g. 230 m. 45 lo. 4,760 cars.
John E. Martin, *Gen. Man*.....Toledo, O.
T. M. Peeler, *Supt.*.....Bucyrus, O.
F. W. Stewart, *Pur. Agt*.....Toledo, O.
J. R. Morgan, *M. M. & C. B.*.....Bucyrus, O.
Ohio Southern. 4-8½ g. 119 m. 19 lo. 625 cars.
D. R. Ennis, *Supt.*.....Springfield. O.
H. C. Norton, *Pur. Agt*.....Indianapolis, Ind.
W. B. Warren, *M. M.*.....Springfield, O.
Ohio & Mississippi Ry. 4-9 g. 615 m. 112 lo. 2,501 cars.
W. W. Peabody, *Gen. Supt.*.....Cincinnati, O.
G. E. Atwood, *Pur. Agt.*.....Cincinnati, O.
J. H. Setchel, *Gen. M. M.*.....Cincinnati, O.
Cin. Div. : C. B. Cole, *Supt.*.....Seymour, Ind.
John Thumser, *M. M.*.....Seymour, Ind.
J. P. Coulter, *M. C. B.*.....Aurora, Ind.
Arthur Dawson, *M. M.*.....Vincennes, Ind.
St. L. & Sp. Div. : C. M. Stanton, *Supt.*St. Louis, Mo.
J. W. Stokes, *M. M.*(Spring. Div.) Pana, Ill.
Louisv. & Ill. Div. : B. Cole, *Supt.*.....Louisville, Ky.
Oil City & Chicago R. R. 4-9 g. 50 m. 6 lo. 50 cars.
A. Vandiwort, *Supt.*.....New Castle, Pa.
Oil City & Pittsburg R. R. 4-8½ g. 6 m. 1 lo. 43 cars.
H. Kent, *Gen. Man.*.....Oil City, Pa.
Old Colony R. R. 4-8½ g. 461 m. 110 lo. 2,802 cars.
J. R. Kendrick, *Gen. Supt.*.....Boston, Mass.
Main Li. Div. : J. H. French, *Supt.*.....Boston, Mass.
R. W. Husted, *Pur. Agt.*.....Boston, Mass.
E. Tarbox, *M. M.*.....Boston, Mass.
A. Gleason, *M. C. B.*.....Boston, Mass.
Cape Cod Div. : C. H. Nye, *Supt.*.....Hyannis, Mass.
No. Div. : A. Webber, *Supt.*.....Fitchburg, Mass.
George W. Reynolds, *M. M.*.....Taunton, Mass.
Sam. Stevens, *M. C. B.*.....Taunton, Mass.
Olean, Bradford & Warren : Bradford Kinzua and
Kendall & Eldred R. Rs. 3 g. 38 m. 9 lo. 222 cars.
J. W. Watson, *Gen. Supt.*.....Olean, N. Y.
J. H. Foster, *Pur. Agt.*.....Buffalo, N. Y.
Charles Turner, *M. M. & C. B.*.....Olean, N. Y.
Oregon Ry. & Nav. Co. 4-8½ g. 225 m. 31 lo. 930 cars.
C. H. Prescott, *Manager*.....Portland, Ore.
J. M. Buckley, *Asst. Man. & Act. Supt.*.....do.
K. Von Oterendorf, *Supt.* (O. Div.) & P. isco, Cal.
J. M. Hunt, *Pur. Agt.*.....Portland, Ore.
C. C. Hobart, *Gen. M. M.*.....The Dalles, Ore.
Chas. A. Phipps, *M. C. B.*.....The Dalles, Ore.
N. G. Hall, *Wn. Reed, Man.*.....Portland, Ore.
James Walch, *M. M.*.....Portland, Ore.
Oregon & California R. R. 4-8½ g. 200 m. 14 lo. 280 c.
R. Koehler, *Gen. Supt.*.....Portland, Ore.
J. Brandt, *Gen. Supt.*.....Portland, Ore.
A. Brandt, *M. M.*.....Portland, Ore.
Owensboro & Nashville R. R. 5 g. 44 m. 3 lo. 70 c.
R. S. Bevier, *Act. Supt.*.....Owensboro, Ky.
H. M. Gabel, *M. M. & C. B.*.....Owensboro, Ky.

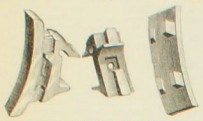
P

Pacific Coast Ry. 3 g. 11 m.
J. M. Fillmore, *Manager*.San Luis Obispo, Cal.
W. H. Masterman, *M. M. & C. B.*.....do.
Painesville & Youngstown R. R. 3 g. 35 m. 7 lo. 310 c.
H. K. Paige, *Rec. & Man.*.....Painesville, O.
J. A. Newcome, *Supt.*.....Painesville, O.
E. H. Baldwin, *M. M.*.....Painesville O.
Panama R. R. 5 g. 58 m. 14 lo. 534 cars.
H. A. Woods, *Supt.*.....Aspinwall, U. S. Col.
F. Z. Fonfield, *Pur. Agt.*.....New York, N. Y.
W. F. Ray, *M. M.*.....Aspinwall, U. S. Col.
Parker & Karns City; and
Karns City & Butler R. Rs. 3 g. 27 m. 5 lo. 84 cars.
W. C. Moberly, *Gen. Supt.*.....Parker City, Pa.
Philip Davies, *M. M.*.....Parker City, Pa.
Wm. Wolford, *M. C. B.*.....Parker City, Pa.
Passumpsic R. R. 4-8½ g. 145 m. 28 lo. 986 cars.
E. Raymond, *Pres. & Pur. Agt.*.....Boston, Mass.
H. E. Folsom, *Supt.*.....Lyndonville, Vt.
L. L. Brigham, *M. M.*.....Lyndonville, Vt.
L. F. Woodard, *M. C. B.*.....Lyndonville, Vt.
Peach Bottom R. R. 3 g. 55 m. 6 lo. 52 cars.
Samuel Dickey, *Gen. Man.*.....York, Pa.
G. R. Dickey, *Supt. & Pur. Agt.*.....York, Pa.
E. H. Williams, *M. C. B.*.....York, Pa.
E. Div. S. Dickey, *Supt.*.....Oxford, Pa.
W. P. Kirk, *M. M.*.....Oxford, Pa.
Pennsylvania Co.'s (9) Roads .....
4-9 g. 2,858 m. 817 lo. 29,432 cars.
Wm. Mullins, *Gen. Pur. Agt.*.....Pittsburg, Pa.
Joseph Wood, *Supt. M. P.*.....Fort Wayne, Ind.
(1) Clev. & Pittsb'g R. R. 4-9 g. 224 m. 97 lo. 3,530 c.
R. F. Smith, *Asst. Man.*.....Cleveland, O.
Philip Renner, *Supt.*.....Wellsville, O.
W. F. Beardsley, *Mast. of Mach.*Wellsville, O.
(2 & 3) Erie & Ashtabula Rds. 178 m. 29 lo. 1,340 c.
John M. Kimball, *Supt.*.....Youngstown, O.
J. A. Wood, *Gen. For. Shops*.....Erie, Pa.
(4) Indianap. & Vincennes Rd. 117 m. 11 lo. 303 cars.
Jas. J. Turner, *Supt.*.....Indianapolis, Ind.
M. M......
(5) Jeffersonville, Madison & Indianapolis R. R.
4-8½ g. 217 m. 74 lo. 784 cars.
E. W. McKenna, *Supt.*.....Louisville, Ky.
Wm. Swanston, *M. M.*.....Jeffersonville, Ind.
J. M. Dickey, *M. C. B.*.....Jeffersonville, Ind.
(6) Nor'nwestern Ohio Ry. 4-9 g. 79 m.
J. S. Morris, *Supt.*.....Toledo, O.
(7) Pittsburg, Fort Wayne & Chicago Ry.
4-9 g. 468 m. 70 lo. 6,782 cars.
E'n Div. : A. B. Starr, *Supt.*.....Allegheny, Pa.
Geo. J. Ramstone, *M. M.*.....Allegheny, Pa.
D. M. Peppard, *M. M.*.....Crestline, O.
W'n Div. : C. D. Law, *Supt.*.....Ft. Wayne, Ind.
D. D. Cassiday, *M. M.*.....Ft. Wayne, Ind.
A. H. Somers, *Gen. For. Shops*.....Chicago, Ill.
(8) Pittsburg, Cincinnati & St. Louis Ry.
4-9 g. 1,172 m. 536 lo. 6,482 cars.
Jas. McCrea, *Gen. Supt.*.....Columbus, O.
R. H. Soule, *Supt M. P. & M.*.....Columbus, O.
P. & Col. Div. : E. B. Taylor, *Supt.*.....Pittsburg, Pa.
C. B. Street, *M. M.*.....Dennison, O.
A. K. Mansfield, *M. C. B.*.....Steubenville, O.
Robt. Curtis, *M. M.*.....Columbus, O.
Thos. Chamberlain, *M. C. B.*.....Columbus, O.
C. & M. Div. : W. F. Black, *Supt.*Zanesville, O.
Leroy Wells, *M. M.*.....Lancaster, O.
Daniel Jewell, *M. C. B.*.....Lancaster, O.
Li. Mi. Div. : Ralph Peters, *Supt.*.....Cincinnati, O.
Leroy Wells, *M. M.*.....Cincinnati, O.
Jos. Underwood, *Gen. For.*man.Cincinnati, O
Ind. Div. : S. D. Miller, *Supt.*.....Richmond, Ind.
W. W. Reynolds, *M. M.*.....Logansport, Ind.
Chas. H. Starr, *M. C. B.*.....Logansport, Ind.
M. J. Rogers, *M. M.*.....Indianapolis, Ind.
Chi. Div. : Chas. Watts, *Supt.*.....Logansport, Ind.
(9) Terre Haute & Indianapolis R. R.
4-8½ g. 374 m. 58 lo. 2,808 cars.
Joseph Hill, *Gen. Supt.*.....St. Louis, Mo.
C. R. Peddle, *P. Agt.*.....St. Louis, Mo.
Geo. Fred Nesbit, *S. M. P. & M.*Terre Haute, Ind.
E. D. Carter, *M. C. B.*.....Terre Haute, Ind.
Clinton Lider, *M. M.*.....Indianapolis, Ind.
Chas. Butler, *M. M.*.....Effingham, Ill.
A. W. Quakenbush, *M. M.*.....Logansport, Ind.
Pennsylvania R. R. Co.'s Roads. (7 Gen. Divs.)
4-9 g. 1,904 m. 1,771 loco. 51,804 cars.
Chas. E. Puch, *Gen Man.*.....Philadelphia, Pa.
Enoch Lewis, *Pur. Agt.*.....Philadelphia, Pa.
John Reilly, *Gen. Supt.*.....Philadelphia, Pa.
T. N. Ely, *Supt. Mo. Po.*(4 Gen. Divs.)Altoona, Pa.
Frank L. Shepard, *Supt. M. P.*.....Altoona, Pa.
(1) Pennsylvania R. R. Divs. .....
S. M. Prevost, *Gen Supt.*.....Altoona, Pa.
Phila. Div. : Wm. J. Latta, *Supt.*Philadelphia, Pa.
H. D. Garrett, *M. M.*.....Philadelphia, Pa.
I.W. Van Houten, *M. C. B.*.....W. Phila., Pa.
Mid. Div. : J. H. Carter, *Supt.*.....Harrisburg, Pa.
E. E. Caum, *M. M.*.....Harrisburg, Pa.
Samuel W. Myers, *M. C. B.*.....Harrisburg, Pa.
Alt'a Div. : Jas. Reed, *Supt.*.....Altoona, Pa.
G. W. Stratton, *M. M.*.....Altoona, Pa.
John P. Levan, *M. C. B.*.....Altoona, Pa.
Pitts. Div. : Robert Pitcairn, *Supt.*.....Pittsburg, Pa.
S. Shaver, *M. M.*.....Pittsburg, Pa.
J. G. Stewart, *M. C. B.*.....Pittsburg, Pa.
W. Pa. Div. : A. P. Boileau, *Supt.*Blairsville, Pa.
Wm. B. Norris, *M. M.*.....Blairsville, Pa.
M. H. Fails, *M. C. B.*.....Blairsville, Pa.
Fred. Div. : J. B. Hutchinson, *Supt.*.....Rockford, Pa.
Tyrone Div. : S. S. Blair, *Supt.*.....Tyrone, Pa.
Lew. Div. : Wm. M. Philips, *Supt.*Lewistown, Pa.
Red. Div. : Thos. A. Roberts, *Supt.*.....Rockford, Pa.
Monong. Div. : David M. Watt, *Supt.*Pittsburg, Pa.
Wm. Lininger, *M. M.*.....Pittsburg, Pa.
(2) United R. Rs. of N. J. Divs. 414 m. 257 lo. 4,000 c.
F. Wolcott Jackson, *Gen. St.*.....Jersey City, N. J.
N.Y. Div. : Robt. E. Pettit, *Supt.*Jersey City, N. J.
H. S. Hayward, *M. M. P.*.....Jersey City, N. J.
David H. Baker, *M. C. B.*.....Jersey City, N. J.
L. A. Bosdevex, *M. M.*.....Jersey City, N. J.
E. F. Boudevex, *M. C. B.*.....Jersey City, N. J.
Bely. Div. : J. A. Anderson, *Supt* Lambertv., N. J.
R. McDowell, *M. M.*.....Lambertville, N. J.
Amboy Div. : J. S. Buckalew, *Supt.*Camden, N. J.
Thos. Kerr, *M. M.*.....So. Amboy, N. J
P. S. Bozart, *M. C. B.*.....So. Amboy, N. J
(3) West Jersey R. R. 4-8 g. 163 m. 29 lo. 1,000 cars.
Joseph Crawford, *Supt.*.....Camden, N. J
W. McAllister, *M. M.*.....Camden, N. J.
C. C. Williams, *M. C. B.*.....Camden, N. J.
(4) Phila., Wilm. & Balt. R.R. 212 m. 86 lo. 1,488 c.
H. F. Kenney, *Gen. Supt.*.....Philadelphia, Pa.
S. A. Hodgson, *M. M.*.....Philadelphia, Pa.
Wm. Lundgren, *M. C. B.*.....Wilmington, Del.
Cen. Div. : L. K. Lodge, *Supt.*.....Philadelphia, Pa.
D. Daniels, *M. M. & C. B.*.....Chester, Pa.
Del. Div. : I. N. Mills, *Supt.*.....Philadelphia, Pa.
(5) Phila. & Erie R. R. Divs. 370 m. 117 lo. 3,445 c.
R. Nevling, *Gen Man.*.....Williamsport, Pa.
A. O. Dayton, *Supt. Mo. Po.*.....Williamsport, Pa.
E'n. Div. : Thos. Gucker, *Supt.*Williamsport, Pa.
Sun. H. & W. Div. : A. Wagers, *Supt.*.....Renovo, Pa.
W. F. Beardsley, *M. M.*.....Sunbury, Pa.
Mid. Div. : E. H. Westfall, *Supt.*.....Renovo, Pa.
Wm. Holman, *M. M.*.....Renova, Pa.
West'n Div. : J. W. Reynolds, *Supt.*.....Erie, Pa.
J. Dyott, *M. C. B.*.....Erie, Pa.
Baltimore Div. : H. W. Knapp, *Supt.*Baltimore, Md.
(7) Baltimore & Potomac R. R. 128 m. 29 lo. 356 c.
A. G. Wilkins, *Supt.*.....Baltimore, Md.
A. W. Sumner, *Pur. Agt.*.....Baltimore, Md.
J. M. Wallis, *Supt. Mo. Po.*.....Baltimore, Md.
J. M. Goode, *M. M.*.....Baltimore, Md.
G. W. Demarest, *M. C. B.*.....Baltimore, Md.
Penn. Coal Co.'s R. R. 4-3 g. 67 m. 23 eng. 2,871 c.
J. B. Smith, *Gen. Supt.*.....Dunmore, Pa.
And. Crane, *M. M.*.....Dunmore, Pa.
Geo. W. Simpson, *M. C. B.*.....Dunmore, Pa.
Pennsylvania & Erie R. R.—Early Branch.
C. R. Early, *Gen. Supt.*.....Ridgeway, Pa.
Penuacola & Perdido R. R. 3 g. 8 m. 5 lo. 73 cars.
B. F. Simmons, *Pr. & Supt.*.....Penacola, Fla.
H. W. Simmons, *Pur. Agt.*.....Penacola, Fla.
R. G. Nicholl, *M. M. & C. B.*.....Penacola, Fla.
Peoria, Decatur & Evansville Ry.
4-8½ g. 254 m. 30 lo. 1,458 cars.
G. L. Bradbury, *Gen. Man.*.....Peoria, Ill.
P. Reilly, *M. M.*.....Mattoon, Ill.
Peoria & Farmington R. R. 4-8½ g. 25 m. 2 lo. 25 c.
D. P. Phelps, *Gen. Man.*.....Monmouth, Ill.
John F. Wallace, *Supt.*.....Farmington, Ill.
Peoria & Pekin Union Ry. 4-8½ g. 39 m. 12 lo. 100 c.
Thos. B. Burnett, *Gen. Supt. & P. A.*Peoria, Ill.
R. F. Hurd, *M. M. & C. B.*.....Peoria, Ill.
Perkiomen R. R. 4-8½ gauge 36 miles.
D. B. Clack, *Supt.*.....Perkiomen Junction, Pa.
Petersburg R. R. 4-8½ g. 64 m. 10 lo. 131 cars.
R. M. Sully, *Gen. Supt.*.....Petersburg, Va.
L. E. Clark, *Pur. Agt.*.....Petersburg, Va.
R. B. Andrews, *M. M.*.....Petersburg, Va.
J. W. Fleming, *M. C. B.*.....Petersburg, Va.
Phila., Wilmington & Balt. R. R. (*See Penna. R. R.*)
Phila. & Atlantic City Ry. 3-6 g. 54 m. 11 lo. 134 cars
F. S. Urie, *Supt. & Pur. Agt.*.....Philadelphia, Pa.
John T. Keihner, *M. M.*.....Camden, N. J.
E. Lippincott, *M. C. B.*.....Camden, N. J.
Phila. & Reading. 4-8½ g. 869 m. 516 lo. 21,900 cars.
John E. Wootten, *Gen. Man.*.....Philadelphia, Pa.
W. S. Wilson, *Pur. Agt.*.....Philadelphia, Pa.
Geo. Ellis, *Supt. Trans.*.....Reading, Pa.
L. B. Paxson, *Eng. of Mach.*.....Reading, Pa.
John H. Rankin, *M. C. B.*.....Reading, Pa.
No. Pa. & R. R'y. Div. : A. Sweigard, *Supt.*, and
Jackson Richards, *M. M.*.....Philadelphia, Pa.
C. & W. Br. : D. C. Reinhart, *Sup.*Williamsport, Pa.
W. H. Ellis, *M. M.*.....Catawissa, Pa.
C. D. Ellis, *M. C. B.*.....Catawissa, Pa.
Leh. & Te. Br. : H. W. Tracy, *Supt.*Pine Grove, Pa.
Coal Br. : J. H. Olhausen, *Supt.*Mahony Plane, Pa.
R. & C. Br. : A. M. Wilson, *Supt.*.....Colum

THE "STANDARD" BRAKE SHOE AND HEAD.

COMBINING

Simplicity, Strength, Durability and Cheapness.



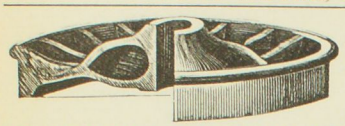
THE BEST IN USE.

Both Head and Shoe quickly adjustable, the latter also easily reversible when required. All the corresponding parts of each thoroughly interchangeable.

Patented Sept. 5, 1882. WRITE FOR CIRCULAR AND PRICES.

STANDARD BRAKE SHOE COMPANY,

FORT WAYNE, IND.



WASON MANUFACTURING CO.,

SPRINGFIELD, MASS

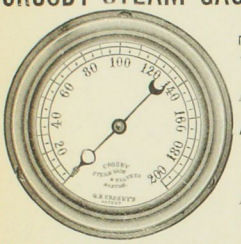
BUILDERS OF

RAILWAY CARS OF ALL DESCRIPTIONS,

CAR WHEELS AND RAILWAY CASTINGS.

H. S. HYDE, Treasurer. G. C. FISK, President.

CROSBY STEAM GAGE & VALVE CO.,



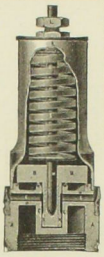
Proprietors and Manufacturers of

The Crosby Locomotive

STEAM GAUGES AND POP SAFETY VALVES.

Acknowledged to be the Most Reliable and Durable.

Adopted by the Largest Locomotive Builders and Railroads in the United States.



Factory and Salesrooms at 95 & 97 Oliver St., Boston, Mass.

$$$ SAVED $$$

1977 NINETEEN HUNDRED SEVENTY-SEVEN 1977

MACHINES

BOTH NEW AND SECOND-HAND

COMPRISING MACHINE AND BLACKSMITH TOOLS OF EVERY DESCRIPTION. WOOD-WORKING MACHINERY IN ALL ITS BRANCHES. PORTABLE ENGINES. UPRIGHT and HORIZONTAL STATIONARY ENGINES, 1 TO 300 HORSE POWER. **S.C.F.&CO.** LOCOMOTIVE FIRE BOX, HORIZONTAL, and UPRIGHT BOILERS, 1 TO 100 HORSE POWER. WATER WHEELS, COTTON AND WOOLEN MACHINERY, STEAM PUMPS, GRISTMILL MACHINERY, Etc., FULLY DESCRIBED, AND PRICES ANNEXED,

Send stamp for same,] In our List No. 23. [stating what you want.

We have the Largest Assortment of Machinery to be found in the hands of any firm in the country.

Works and Main Office, Manchester, N. H. **S. C. FORSAITH & CO.**

Branch Office and Warerroom, 209 Center street, New York City.

FOUNDRYMEN ATTENTION!

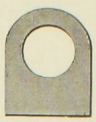
FOR POWER MOULDING MACHINES

Send for Descriptive Circular to

DRUMMOND MANUFACTURING CO., Patentees, Louisville, Ky.

VULCANIZED FIBRE COMPANY,

SOLE MANUFACTURERS OF



HARD & FLEXIBLE VULCANIZED FIBRE.

Flexible Vulcanized Fibre Dust Guards and Oil-Box Covers,

being absolutely unaffected by oil or heat, are far more durable and efficient than Leather, and much cheaper.

Office and Works; Wilmington, Del.

THE RAILWAY EQUIPMENT CO.,

E. P. CUTLER & CO., Agents, 15 OLIVER ST., BOSTON, MASS., U. S. A.

BACON BROS., 41 ST. FRANCOIS XAVIER ST., MONTREAL, P. Q.

CORRESPONDENCE SOLICITED.

CHAINS

UNION CHAIN WORKS

REITER & CO.,

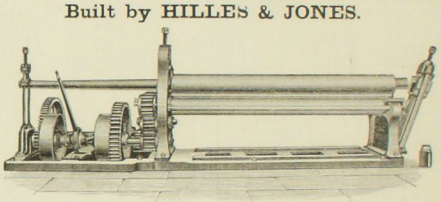
MANUFACTURERS OF ALL KINDS OF CHAINS

BRAKE CHAIN A SPECIALTY.

Twenty-Ninth and Railroad, Pittsburgh, Pa

PATENT PLATE BENDING ROLLS.

Built by HILLES & JONES.



DESCRIPTION.

The annexed cut represents all sizes we make to be driven by belt. It will be seen at once that it is but the work of a moment to balance the top roll and lower the hinge housing, to take out the plate when a full circle is bent. The rolls are all made of Solid Wrought Iron, the Balance Bar being a part or extension of the top roll. There is a Cast-Iron Bed-Plate under the entire machine. To save any shifting of belts we put in Friction Pulleys, which enable the rolls to be started, stopped or reversed instantly.

WOOD WORKING MACHINERY.

UNIVERSAL WOOD WORKERS,

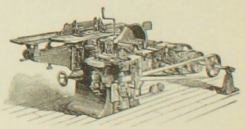
PLANERS, MATCHERS,

BAND SAWS, SCROLL SAWS,

RAIL-ROAD & CAR MACHINERY.

BENTEL, MARGEDANT & CO.,

HAMILTON, OHIO, U. S. A.



CLIMAX WOOD WORKER.

STICKER SIDE.

NATIONAL RAILWAY PATENT WASTE COMPANY.

The most economical, efficient and desirable material for packing JOURNAL BOXES of CARS is Cotton Seed Hulls.

The company proposes to license railroads to use this valuable article for packing, on very liberal terms

Send for circular to

H. W. GUERNSEY, President, 240 Broadway, New York.

JOYCE, CRIDLAND & CO.,

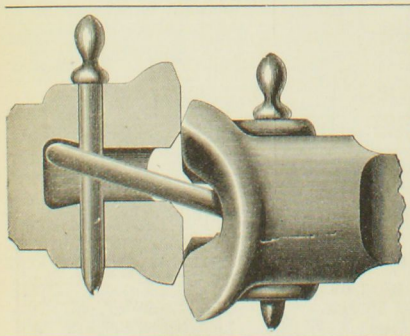
Cor. Wyandotte St. and Railroad, DAYTON, O.,

MANUFACTURERS OF

LEVER, COMPOUND LEVER, AND Screw Jacks.

We make 27 varieties of these Jacks, and have more in process of construction.

Send for Illustrated Catalogue and Price List.



SAFFORD'S SAFETY DRAW-BAR.

"VICTORY OVER MORE THAN 30 CONTESTANTS."

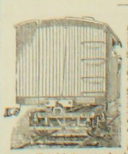
Victory over more than 30 Self-Couplers in the Master Car-Builder's Convention of June, 1876. Also indorsement for safety in coupling by the Yard Masters, in their Convention, June, 1877, and by 300 others who were unable to attend the Convention, and 300 railroad officials who are resident in 26 States, and who admitted superiority over any other yet produced. Try 30 free of royalty, and see for yourself! Pattern free, and no change in timbers or connections. Those made by Wilson, Walker & Co., Pittsburgh, Pa., *will save 200 per cent. in repairs*, and give double life service over *old styles of* wrought iron. About 43,000 in use by 146 railroads. The *saving in repairs* by using *my invention* is from 20 per cent. to 80 per cent. as per *report of many officers.*

J. B. SAFFORD,

EAGLE IRON WORKS

BUFFALO, N. Y.

The Perry Safety Freight Car Coupling.



Several thousand of them are at work on the E. & T. H., C. & E. I., C., R. I. & P., T. H. & I. C., T. & M. C., St. P. M. & M., N. L., N. R. & M., Fitchburg, N. Y., P. & O., H. & C. W., Conn. R. C., V., N. Y. O. & W., N. Y., W. S. & B., G. T. R., N. Y., N. H. & H., N. Y. C. & H. R., N. Y. & N. E., N. Y., L. E. & W., D. & N., Naugatuck & Housatonic Railroads. Nine of these roads have adopted it for their freight cars. Trial lots may be had without royalty. Office of the Company, 230 La Salle Street, opposite of western entrance to Grand Pacific Hotel.

L. MOORE, Secretary. W. V. PERRY, Gen'l Agt.

D. P. SLATTERY, President.
JOHN B. GRAY, Vice-Pres. and Gen. Agt.
E. B. LEIGH, Sec'y and Treas.

The American Brake Co.,

MANUFACTURERS OF

AUTOMATIC FREIGHT CAR BRAKES AND STEAM DRIVER AND TENDER BRAKES,

ST. LOUIS, MO.

S. W. McMUNN, Supt.
A. BLAIR, Attorney.

We offer to Railway Companies the only Exclusively Independent Self-Acting Freight Train Brake which has yet been adopted by any Railway in the World. Our Steam Driver and Tender Brake is acknowledged to be the Cheapest, Simplest and BEST Power Brake now in use. Is now used by over 50 different Railroads. We are willing to furnish any railroad company one or more sets of our Steam Driver and Tender Brake upon approbation of 60 or 90 days, to be returned at our expense if not satisfactory.

Rochester & Pittsb'g. R. R. 4-8½ g. 108 m. 11 lo. 612 c.
Geo. E. Merchant, *Gen. Man.*.....Rochester N. Y.
J. P. Hovey, *M. M.*.....Rochester. N. Y.
Rock Island & Mercer County R. R. and
Rock Id. & Peoria Ry. 4-8½ g. 113 m. 12 lo. 357 c.
R. R. Cable, *V.-P. & Gen. Supt.*.Rock Island, Ill.
R. I. & P. Ry.; H. B. Sudlow, *Supt. & P. A.*.....do.
Joseph Elder, *M. M.*.....Peoria, Ill.
R. I. & M. C. Rd.; B. T. Cable, *Supt.*Rock Island, Ill.
H. H. Parks, *M. M.*.....Rock Island, Ill.
Rome (Ga.) R. R. 5 g. 20 m. 2 lo. 13 cars.
Eben Hillyer, *Supt.*.....Rome, Ga.
O. W. Harbin, *M. M. & C. R.*.....Rome, Ga.
Rome, Watertown & Ogdensburg R. R.
4-8½ g. 400 m. 51 lo. 1,400 cars.
E. A. Van Horne, *Gen. Supt.*.....Oswego, N. Y.
Geo. W. B. Cushing, *Pur. Agt.*.New York, N. Y.
Geo. H. Haselton, *M. M. & C. R.*.Oswego, N. Y.
Rumford Falls & Buckfield R. R. 4-8½ g. 29 m. 21 42 c.
O. Hayford, *Supt.*.....Canton. Me.
O. Spaulding, *Pur. Agt.*.....Buckfield, Me.
E. R. Oldham, *M. M.*.....Buckfield, Me.

S

Sabine & East Texas Ry. 4-8½ g. 104 m. 5 lo. 333 c.
J. R. Morford, *Gen. Supt.*.....Beaumont, Tex.
A. J. Meagher, *M. M.*.....Beaumont, Texas.
Sacramento & Placerville R. R. 4-8½ g. 49 m. 3 lo. 68 c.
J. B. Wright, *Supt. & P. A.*.....Sacramento, Cal.
A. J. Stevens *M. M.*.....Sacramento, Cal.
Benj. Welch, *M. C. R.*.....Sacramento, Cal.
Saginaw Bay & Northw'n R. R.
J. Jackson, *Gen. Man.*.....Pinconning, Mich.
F. T. Lillote, *Act. Pur. Agt.*...Pinconning, Mich
Edward Keeler, *M. M.*.....Pinconning, Mich.
Saginaw Valley & St. Louis R. R. 4-8½ g. 35 m. 41, 64 c.
N. W. Merrill, *Supt.*.....Saginaw, Mich.
Allan Bourn, *Pur. Agt.*.....Detroit, Mich.
Geo. C. Watrous, *M. M.*.....Ionia, Mich.
San Francisco & No. Pac. 4-8½ g. 112 m. 11 lo. 244 c.
Arthur Hughes, *Gen. Man.*..San Francisco, Cal.
H. C. Whiting, *Supt.*.....Petaluma, Cal.
M. C. R......Donahue, Cal.
Savannah, Florida & W'n Ry. 5 g. 422 m. 20 lo. 695 c.
H. S. Haines, *Gen. Man.*.....Savannah, Ga.
R. G. Fleming, *Supt.*.....Savannah, Ga.
F. S. Pendergast, *Eng. & Asst. Supt.*Savannah, Ga.
A. A. Ayeilla, *Pur. Agt.*.....Savannah, Ga.
James D. Hollister, *M. of Mach.*.Savannah, Ga.
G. M. D. Riley, *Pur. Local Dept.*..Savannah, Ga.
Jos. W. Rowell, *Pur. Car Dept*.Savannah, Ga.
Sav., Griffin & No. Ala. R. R. *Op. by Central (Ga.).*
Schuylhill & Lehigh R. R. 4-8½ g. 43 miles.
Eldredge Dale, *Supt.*.....Reading, Pa.
Scoharie Valley R. R. (*See Middleburg & Sch.*)
Scioto Valley R. R. 4-8½ g. 131 m. 15 lo. 460 cars.
Geo. Skinner, *Supt.*.....Columbus, O
R. Bromley, *M. M. & P. A.*.....Portsmouth, O.
Seaboard & Roanoke R. R. 4-8½ g. 80 m. 21 lo. 381 c.
E. G. Ghio, *Most. of Trans.*.....Portsmouth, Va.
M. M. Pendleton, *S. M. P. & M.*Portsmouth, Va.
Shenandoah Valley R. R. 4-8½ g. 143 m. 15 lo. 104 c.
Henry Fink, *Gen. Man.*.....Lynchburg, Va.
J. H. Sands, *Supt.*.....Roanoke, Va.
W. C. De Armond, *Pur. Agt.*.Philadelphia, Pa.
Chas. Blackwell, *Supt. of M. P.*..Roanoke, Va.
W. Welch, *M. M.*.....Roanoke, Va.
Shenango & Allegheny R R. 4-8½ g. 47 m. 6 lo. 156 c.
J. T. Blair, *G. Supt. & Pur. Agt.*.Greenville, Pa.
Edw. Richardson, *M. M. & C. R.*Greenville, Pa.
Shepaug R. R. 4-8½ g. 38 m. 3 lo. 27 cars.
Edwin McNeill, *Supt.*.....Litchfield, Ct.
C. M. Allen, *M. M.*.....Litchfield, Ct.
Ship Is., Ripley & Ky. R. R. 3 g. 25 m. 2 lo. 23 cars.
C. L. Harris, *Supt. & Pur. Agt.*.....Ripley, Miss.
W. H. Pheips, *M. M.*.....Ripley, Miss.
Sioux City & Pacific R. R. 4-8½ g. 427 m. 21 lo. 584 c.
P. E. Hall, *Gen. Man. & P. A.*Cedar Rapids, Ia.
C. M. Lawler, *Gen. Supt.*.....Missouri Valley, Ia.
J. S. Wattles, *Supt.*.....Missouri Valley, Ia.
C. F. McCoy, *Asst. Supt.*.....Blair, Neb.
S. A. Teal, *M. M.*.....Missouri Valley, Ia.
W. H. Ramseyer, *M. C. R.*....Missouri Valley, Ia.
Sodus Bay & Southern Ry. 4-8½ g. 34 m. 4 lo. 40 c.
S. S. Stuart, *Supt. & Pur. Agt.*Sodus Point, N. Y.
C. H. Hill, *M. C. R.*.....Sodus Point, N. Y.
South Carolina Ry. 5 g. 243 m. 42 lo. 685 cars.
John B. Peck, *Gen. Man.*.....Charleston, S. C.
S. B. Pickens, *Pur. Agt.*.....Charleston, S. C.
P. J. Cochrane, *Mast. of Mach.*Charleston, S. C.
Geo. H. Gramling, *M. C. R.*.....Charleston, S. C.
South-Eastern Ry. 4-8½ g. 290 m. 26 lo. 826 cars.
Bradley Barlow, *Gen. Man.*.....Montreal, Can.
T. A. McKinnon, *Asst. Man.*.....Montreal, Can.
H. A. Allen, *Supt.*.....Richford, Vt.
A. G. Eastman, *M. M.*.....Richford, Vt.
South Florida R. R. 3 gauge 40 m. 4 lo. 20 cars.
B. R. Swoope, *Supt. & P. A.*.....Sanford, Fla.
C. C. Haskell, *Pur. Agt.*.....Sanford, Fla.
J. A. Campbell, *M. M.*.....Sanford, Fla.
A. D. Stentiford, *M. C. R.*.....Sanford, Fla.
South Mountain R. R. 4-8½ g. 18 m. 4 lo. 22 c.
W. H. Woodward, *Supt.* Pine Gr've Furnace, Pa.
South Pacific Coast R. R. 3 g. 81 m. 10 lo. 260 cars.
A. H. Fracker, *Gen. Supt.*.San Francisco, Cal.
G. H. Waggoner *Pur. Agt.*.San Francisco, Cal.
E. L. Reese, *M. M. & C. R.*.....Newark, Cal.
South-Western R. R. (Ga.) (*See Central of Ga.*)
South-Western Ry. (Ky.) 4-8½ g. 4 m. 1 lo. 38 cars.
J. M. Wilson, *Supt.*.....Harrodsburg, Ky.
J. Tomlinson, *Pur. Agt.*.....Harrodsburg, Ky.
Southern Central R. R. 4-8½ g. 113 m. 16 lo. 447 c.
James G. Knapp, *Supt. & Pur. Agt.*Auburn, N. Y.
Chas. G. Brown, *M. M.*.....Auburn, N. Y.
H. Mooney, *M. C. R.*.....Auburn, N. Y.
Southern Maryland R. R. 4-8½ g. 20 m. 1 lo. 5 c.
Robert Knight, *Supt.*.....Brandywine, Md.
T. R. Joyce, *M. M.*.....Brandywine, Md.
Southern Pacific R. R. 4-8½ g. 198 m. 30 lo. 728 c.
Northern Div. (*For other Divs. see Cen. Pac.*)
A. C. Bassett, *Supt.*.....San Francisco, Cal.
J. R. Watson, *Pur. Agt.*.....Sacramento, Cal.
J. T. Wilson, *M. M.*.....San Francisco, Cal.
F. N. Bellisle, *M. C. R.*.....San Francisco, Cal.
Springfield, Effingham & So. E. and Bloomfield Rys.
3 g. 89 m.
W. C. Lyon, *Gen. Man. & Pur. Agt.*Robinson, Ill.
J. S. Pickering, *M. M. & C. R.*.....Effingham, Ill.
Spring Hill & Parrsboro Ry. 4-8½ g. 32 m. 1 lo. 64 c.
A. Killam, *Gen. Man.*.....Parrsboro', N. S.
K. McKinnon, *M. M.*.....Parrsboro, N. S.
St. Croix & Penobscot R. R. 4-8½ g. 32 m. 3 lo. 195 c.
S. W. Haycock, *Supt. & Pur. Agt.*..Calais, Me.
G. H. Corsen, *M. M.*.....Milltown, Me.
H. C. Tincker, *M. C. R.*.....Milltown, Me.
St. John & Maine Ry. 4-8½ g. 92 m. 9 lo. 146 cars.
H. D. McLeod, *Supt. & P. Agt.*..St. John, N. B.
Andrew Davis, *M. M.*.....St. John, N. B.
St. John's Ry. 4-8½ g. 14½ m. 2 lo. 24 cars.
R. McLaughlin, *Pr. & Supt.*.Jacksonville, Fla.
Geo. Ferro, *M. of Mach.*.....Tocoi, Fla.
St. Johnsbury & Lake Champ 4-8½ g. 120 m. 10 lo. 397 c.
A. B. Jewett, *Supt. & P. A.*..St. Johnsbury, Vt.
Geo. E. Howe, *M. M. & C. R.*St. Johnsbury, Vt.
St. Joseph & Des Moines R. R. (*See K. C., St. J. & C. B.*)
St. Lawrence & Ottawa Ry. 4-8½ g. 59 m. 10 l. 146 c.
Archer Baker, *Gen. Supt.*.....Montreal, Ont.
R. Blackwell, *Mech. Supt.*.....Montreal, Ont.
St. Louis, Alton & Terre Haute R. R.
Main Line. (*See Ind. & St. L. Div. : Ohio Ry.*)
St. Louis & Cairo Div.: 4-8½ g. 137 m. 17 lo. 778 c.
G. W. Parker, *Gen. Man.*.....St. Louis, Mo.
J. L. Hinckley, *Supt.*.....Belleville, Ill.
A. M. De Clerq, *M. M.*.....St. Louis, Mo.
St. Louis Bridge Co. and Tunnel R. R.
4-8½ g. 27 m. 18 lo. 11 cars.
Wm. Taussig, *Gen. Man.*.....St. Louis, Mo.
A. W. Dickinson, *Supt.*.....St. Louis, Mo.
J. E. Williams, Jr., *Pur. Agt.*..St. Louis, Mo.
H. M. Smith, *M. M.*.....St. Louis, Mo.
St. Louis Coal R. R. 4-8½ g. 28 m. 1 lo. 78 cars.
Jas. Prentice, *Supt.*.....Carbondale, Ill.
Jas. Green, *Pur. Agt.*.....St. Louis, Mo.
St. Louis, Ft. Scott & Wichita R. R. 4-8½ g. 30 miles.
F. Tierman, *V. P. & Gen. Man.*.Fort Scott, Kan.
F. W. Miller, *Supt.*.....Fort Scott, Kan.
Henry Berger, *M. M.*.....Ft. Scott, Kan.
A. A. Tiddell, *M. C. R.*.....Ft. Scott, Kan.
St. L., Peoria & Northern R. R. 4-8½ g. 85 m. 5 lo. 65 c.
W. W. Walker, *Gen. Supt.*.....Hannibal, Mo.
Geo. Douglass, *Pur. Agt.*.....Hannibal, Mo.
St. Louis, Iron Mtn. & So. Ry. (*See Mo. Pacific Ry.*)
St. L. Keokuk & No.-W'n. 4-8½ g. 187 m. 14 lo. 312 c.
R. Law, *Gen. Supt.*.....Keokuk, Ia.
G. B. Harris, *Pur. Agt.*.....Chicago, Ill.
Wm. H. Bartlett, *M. M.*.....Keokuk, Ia.
St. L. Salem & Little Rock. 4-9 g. 69 m. 5 lo. 103 c.
H. A. Crawford, *V. Pr. & P. A.*..St. Louis, Mo.
E. B. Sankey, *Supt.*.....Salem, Mo.
Thomas Everson, *M. M.*.....Steelville, Mo.
J. W. Hudson, *M. C. R.*.....Steelville, Mo.
St. L., Van. & T. H. (*See T. H. & I. Div. of Penna. Co.*)
St. Louis & Cairo R. R. 3 g. 152 m. 22 lo. 896 cars.
Chas. Hamilton, *Gen. Supt.*.....St. Louis, Mo.
R. M. Pringle, *M. M.*.....St. Louis, Mo.
St. L. & San Fran. Ry. 4-8½ g. 834 m. 80 lo. 2,700 c.
C. W. Rogers, *V. P. & Gen. Man.*St. Louis, Mo.
D. H. Nichols, *Mast. Trans.*.No. Springfield, Mo.
A. G. Thompson, *Pur. Agt.*.....do.
M. Kearney, *M. M. & C. R.*.No. Springfield, Mo.
Mo. & Ark. Div.: W. A. Thoms, *Supt.*.....do.
Kan. Div.: J. B. Weworth, *Supt.*Neodesha, Kan.
St. Martin's & Upham Ry. 4-8½ g. 30 m. 2 lo. 8 cars.
A. E. Killam, *Manager*.....St. Martin's, N. B.
St. Paul, Minneapolis & Manitoba Ry.
4-8½ g. 1,125 m. 168 lo. 4,331 cars.
A. Manvel, *Gen. Man.*.....St. Paul, Minn.
S. R. Stimson, *Gen. Supt.*.....St. Paul, Minn.
E. B. Wakeman, *Asst. Gen. Supt.*St. Paul, Minn.
J. C. Morrison, *Pur. Agt.*.....St. Paul, Minn.
H. Middleton, *M. M. & C. R.*.....St. Paul, Minn.
Breck. Div.: A. Guthrie, *Supt.*.....St. Paul, Minn.
F. F. Div.: J. B. Rice, *Supt.*.....St. Paul, Minn.
No'n'rn Div.: H. Smith, *Supt.*.....Crookston, Minn.
St. Paul & Duluth R. R. 4-8½ g. 196 m. 24 lo. 580 c.
H. P. Breed, *Asst. Gen. Supt.*.....St. Paul, Minn.
J. G. Callahan, *Pur. Agt.*.....St. Paul, Minn.
W. McFarland, *M. M.*.....St. Paul, Minn.
John Hill, *M. C. R.*.....St. Paul, Minn.
Sterling Mountain Ry. 6 g. 8 m. 2 lo. 145 cars.
Wm. Bissimer, *Supt.*.....Sloatsburg, N. Y.
Syracuse, Binghamton & N. Y. R. R. (*See D. L. & W.*)
Syracuse, Chenango & N. Y. 4-8½ g. 44 m. 4 lo. 60 c.
Albert Allen, *Supt.*.....Syracuse, N. Y.
George W. West, *M. M.*.....Syracuse, N. Y.
Wm. G. Raynolds, *M. C. R.*.....Syracuse, N. Y.
Syracuse, Geneva & Corning; Corning, Cowanasque & Antrim R. Rs. 4-8½ g. 121 m. 28 lo. 1,044 c.
A. H. Horton, *Supt.*.....Corning, N. Y.
W. E. Gorton, *Asst. Supt.*.....Corning, N. Y.
Andrew Beers, *Pur. Agt.*.....Corning, N. Y.
C. G. Patchell, *M. M.*.....Corning, N. Y.
C. J. Butler, *M. C. R.*.....Corning, N. Y.

T

Terre Haute & So.-Eastern Ry. 4-9 g. 40 miles.
Geo. Atherton, *Supt.*.....Terre Haute, Ind.
Texas-Mexican Railway. National Ry.
3 g. 333 m. 28 lo. 600 cars.
G. C. Gardner, *Gen. Man.*.....New York, N. Y.
R. C. Peebles, *Supt.*.....Mexico, Mex.
J. Dougherty, *Pur. Agt.*.....New York, N. Y.
S. T. Fuller, *Gen. Supt.*.....Corpus Christi, Tex.
P. J. Milan, *M. M. & C. R.*.....do.
Mex. Nat. Ry.: J. C. Monroe, *M. M.*..Mexico, Mex
Texas Western Ry. 3 g. 42 m. 2 lo. 34 cars.
J. W. Goodwin, *Supt.*.....Houston, Tex.
T. F. Gilspin, *M. M.*.....Houston, Tex.
Texas & New Orleans; Louisiana W'n R. Rs.
4-8½ g. 217 m. 25 lo. 900 c.
J. F. Crosby, *Gen. Man.*.....Houston, Tex.
P. B. Watson, *Pur. Agt.*.....Houston, Tex.
C. A. Burton, *Supt.*.....Houston, Tex.
D. C. Smith, *M. M.*.....Houston, Tex.
J. M. Mather, *M. C. R.*.....Houston, Tex.
(*See Mo. Pac. Ry.*)
Texas & Pacific.
Texas & St. Louis Ry. 3 g. 304 m. 19 lo. 338 cars.
J. B. Van Dyne, *Gen. Supt.*.....Tyler, Tex.
F. W. Paramore, *Pur. Agt.*.....St. Louis, Mo.
L. B. Fish, *Pur. Agt.*.....Tyler, Texas.
W. J. Lewis, *M. M. & C. R.*.....Tyler, Tex.
Tioga and Elmira State Line R. Rs.
4-8½ and 6 g. 54 m. 17 lo. 953 cars.
L. H. Sbattuck, *Supt.*.....Blossburg, Pa.
J. A. Hamburg, *Pur. Agt.*.....New York, N. Y.
Pere Bonny, *M. M.*.....Blossburg, Pa.
D. H. Stratton, *M. C. R.*.....Blossburg, Pa.
Toledo, Can. Ar. & Gr. Tr. Ry. 4-8½ g. 84 m. 9 lo. 150 c.
J. M. Ashley, *Gen. Man.*.....Ann Arbor, Mich.
H. W. Ashley, *Supt. & Pur. Agt.*.....do
C. C. Dodge, *M. M.*.....Ann Arbor, Mich.
Toledo, Cin. & St. Louis R. R. 3 g. 465 m. 63 lo. 2,200 c.
T. A. Hopkins, *Gen. Man.*.....Toledo, O.
J. F. Wiers, *Supt. Mach. & P. Agt.*Toledo, O.
Toledo Div.: W. N. Moffatt, *Supt.*; and
J. G. Clifford, *M. M.*.....Delphos, O.
C. H. Mead, *Gen. M. C. R.*.....Delphos, O.
S.-E'n & Dayton Div.: D. T. Bacon, *Supt.*Dayton, O.
J. Parsons, *M. M.*.....Dayton, O.
Tonawanda Valley & Cuba and Bradford, Eldred & Cuba R. Rs. 3g. 19 m. 1 lo. 13 cars.
C. D. Williams, *Supt. & Pur. Agt.*.Cuba, N. Y.
Toronto, Grey & Bruce Ry. 4-8½ g. 191 m. 20 lo. 446 c.
Edmund Wragge, *Gen. Man.*.....Toronto, Can.
W. Watson, *Pur. Agt*.....Toronto, Can.
David Preston, *M. M.*.....Toronto, Can.
Troy & Boston R. R. 4-8½ g. 48 m. 20 lo. 484 cars.
D. Robinson, *Pres. & Pur. Agt.*.....Troy, N. Y.
Joseph Crandell, *Supt.*.....Troy, N. Y.
Z. B. Davis, *M. M.*.....Troy, N. Y.
R. V. Coon, *M. C. R.*.....Troy, N. Y.
Tuckerton R. R. 4-8½ g. 31 m. 2 lo. 28 cars.
J. J. Pharo, *Supt.*.....Tuckerton, N. J.

U

Ulster & Delaware R. R. 4-8½ g. 74 m. 10 lo. 214 cars.
Jas. H. Jones, *Supt.*.....Rondout, N. Y.
Joseph Rush, *M. M.*.....Rondout, N. Y.
John H. Decker, *M. C. R.*.....Rondout, N. Y.
Union Pacific Ry. 4 Gen. Divs.
3 & 4-8½ g. 4,270 m. 318 lo. 6,157 cars.
S. H. H. Clark, *Gen. Man.*.....Omaha, Neb.
Thos. L. Kimball, *Asst. Gen Man.*Omaha, Neb.
A. D. Clarke. *Pur. Agt.*.....Omaha, Neb.
I. H. Congdon, *Gen. M. M.*.....Omaha, Neb.
Geo. E. Sheves, *Supt. Car Dept.*.Omaha, Neb.
(1) Neb. Div.: P. J. Nichols, *Gen. Supt.*.Omaha, Neb.
Robt. McConnell, *M. M.*.....Omaha, Neb.
A. M. Collett, *M. C. R.*.....Omaha, Neb.
Jas. H. McConnell, *M. M.*.....No. Platte, Neb.
A. Reis, *For. Car. Sh.*.....No. Platte, Neb.
T. A. Davies, *M. M.*.....Cheyenne, Wy. T.
J. E. Davies, *For. Car. Sh.*.Cheyenne, Wy. T.
(2) Col. Div.: A. A. Egbert, *Gen. Supt.*.....Denver, Col.
Fred. Metzdiwer, *M. M.*.....Golden Col.
E. G. Thomas, *For. Car. Sh.*.....Golden, Col.
D. & S. P. Div.: J. H. Kirk, *M. M.*.....Denver, Col.
(3) Wy. Div.: Edw. Dickinson, *G. Supt.*Laramie, Wy. T.
R. Galbraith, *M. M.*.....Laramie, Wy. T.
R. M. Galbraith, *M. M.*.....Rawlins, Wy. T.
Frank Blake, *For. Car. Sh.*.....Rawlins, Wy. T.
C. C. Quinn, *M. M.*.....Evanston, Wy. T.
R. V. Brinkley, *For. Car. Sh.*Evanston, Wy. T.
Idaho Div.: W. H. Doddridge, *Gen. Supt.*Ogden, U.
R. Craft, *M. M.*.....Logan, U.
F. Reardon, *M. M.*.....Eagle Rock, Idaho.
F. M. Shoemaker, *For. Car. Sh.*Eagle R'k, Ida.
(4) Kansas Div.: S. T. Smith, *G. Supt.*Kansas Cy, Mo.
Jno. Mackenzie, *Supt Mach.*Armstrong, Kan.
T. B. Roberts, *M. C. R.*.....Armstrong, Kan.
K. Val. Div.: J. O. Brinkerhoff, *Supt.*Kan. Cy, Mo.
Jas. Mackenzie, *M. M.*.....Elwood, Kan.
3 g. 150 miles.
(5) Kan. Cen. Div.: .....Leavenworth, Kan.
W. J. Kelley, *Supt.*.....Leavenworth, Kan.
And. Goldthwaite, *M. M.*.....Leavenworth, Kan.
J. P. Newman, *M. C. R.*.....Leavenworth, Kan.
(7) Nevada Central Ry. 3 g. 93 m. 5 lo. 82 cars.
F. W. Dunn, *Supt.*.....Battle Mountain, Nev.
Z. T. Spriggs, *M. M.*.....Battle Mountain, Nev.
United States Rolling Stock Co. 23 lo. 4,834 cars.
A. Hegewisch *Pres.*.....New York, N. Y.
C. F. Jauriet, *Gen. M. M.*.....Chicago, Ill.
W. H. Chaddock, *Pur. Agt.*.....Chicago, Ill.
4-8½ g. 290 m.
John Sharp, *Gen. Supt.*.....Salt Lake City, Utah.
S. H. Hill, *Pur. Agt.*.....Salt Lake City, Utah.
W. H. Armstrong, *M. M.*.....Salt Lake City, Utah.
Peter Reid, *M. C. R.*.....Salt Lake City, Utah.
Utah & Nevada Ry. 4-8½ g. 30 m. 3 lo. 65 cars.
W. W. Riter, *Gen. Man.*.....Salt Lake City, Utah.
Robert Anderson, *M. M.*.....Salt Lake City, Utah.
Utah & Pleasant Valley Ry.
Jas. Mackenzie, *M. M.*.....Salt Lake City, Utah.
Utica, Ithaca & Elmira Ry. 4-8½ g. 120 m. 11 lo. 152 c.
J. L. Greatsinger, *Supt.*.....Breesport, N. Y.
Geo. W. Cleveland, *M. M.*.....Breesport, N. Y.
Wm. Ellis, *M. C. R.*.....Breesport, N. Y.
Utica, & Black Riv. R. R. 4-8½ g. 180 m. 20 lo. 629 c.
J. F. Maynard, *Gen. Supt. & P. A.*.Utica, N. Y.
John Bailey, *M. M.*.....Utica, N. Y.
David James, *M. C. R.*.....Utica, N. Y.

V

Vaca Vall. & Clear Lake R. R. 4-8½ g. 30 m. 2 lo. 19 c.
G. B. Stevenson, *Gen. Supt.*.....Vacaville, Cal.
Valley Ry. 4-8½ g. 59 m. 10 lo. 317 cars.
J. E. Tusk, *Supt. & P. Agt.*.....Cleveland, O.
Chas. Blanchard *M. C. R.*.....Cleveland, O.
Vernon, Greensburg & Rushville R. R. 25 m.
Horace Scott, *V.-Pres.*.....Greensburg, Ind.
Virginia Midland Ry. (*See Rich. & Dan.*)
Virginia & Truckee R. R. 4-8½ g. 54 m. 17 lo. 375 c.
Carson & Colorado R. R. 3 g. 158 m. 10 lo. 70 m.
H. M. Yerington, *Gen. Supt.*.....Carson, Nev.
R. J. Laws, *Supt.* (C. & Col.).....Carson, Nev.
C. P. Mason, *Pur. Agt.*.....Carson, Nev.
I. N. Harding, *M. M.*.....Carson, Nev.
B. F. Lyon, *M. C. R.*.....Carson, Nev.

W

Wabash, Chester & W'n R. R. 4-8½ g. 42 m. 2 lo. 32 c.
J. L. Hinckley, *Gen. Supt.*.....Chester, Ill.
Wabash, St. Louis & Pacific Ry. (3 Gen. Divs.)
4-8½ g. 3,241 m. 508 lo. 17,230 cars.
John C. Gault, 2d *V. P.*.....St. Louis, Mo.
Robert Andrews, *Gen. Supt.*.....St. Louis, Mo.
W. S. Lincoln, *Pur. Agt.*.....St. Louis, Mo.
Jacob Leinbach, *Gen. M. M.*.....Springfield, Ill.
U. J. Kohler, *Gen. M. C. R.*.....Toledo, O.
(1) Eas'n Div.: J. B. Barnes, *M. M.*Fort Wayne, Ind.
Oh. & Ind. Div.: J. W. Stevens, *Supt.*Ft. Wayne, Ind.
Peru Div.: E. C. Murphy, *Supt.*.....Peru, Ind.
John McKenna, *M. M.*.....Peru, Ind.
Cairo Div.: H. Moore, *Supt.*.....Cairo, Ill
A. Van Tuyl, *M. M.*.....Carmi, Ill
(2) Middle Div.: R. M. Hemphill, *M. C. R.*Peoria, Ill.
Ill. Div.: J. Clark, *Supt.*.....Springfield, Ill.
B. B. Rose, *M. C. R.*.....Decatur, Ill.
Chicago Div.: A. A. Hobart, *Supt.*.....Chicago, Ill.
Peoria Div.: P. L. Hopkins, *Supt.*.....Peoria, Ill.
Rant'l Div.: B. F. Mathias, *Supt.*.....Rantoul, Ill.
J. McCarthy, *M. M.*.....Rantoul, Ill.
(3) Western Div.: W. H. Selby, *M. M.*.....Moberly, Mo.
C. S. Buck, *M. C. R.*.....Moberly, Mo.
Missouri Div.: H. S. Miner, *Supt.*.....Moberly, Mo.
C. B. & Q. Div.: J. M. Blanchard, *Supt.*.....Aurora, Ill.
J. S. Hazen, *M. C. R.*.....Stanberry, Mo.
Quincy Div.: F. D. Schermerhorn, *S. Quincy*, Ill.
Iowa Div.: E. N. Armstrong, *Supt.*.....Keokuk, Ia.
D. Moin. Div.: H. B. Skeele, *Supt.*.Des Moines, Ia.
Walla Walla & Columbia Riv. R. R. (*See Ore. Ry.*
Walkill Ry. (*See N. Y., West. Sh. & H.*)
Warwick Valley R. R. 4-8½ g. 28 m. 2 lo. 18 cars.
Grinnell Burt, *Pres. & Pur. Agt.*Warwick, N. Y.
S. Mills, *M. M.*.....Warwick, N. Y.
Washington & Western R. R. 4-8½ g. 53 m. 5 lo. 83 c.
H. McLean, *Gen. Supt.*.....Alexandria, Va.
Edward Dunn, *M. M.*.....Alexandria, Va.
John Harrison, *M. C. R.*.....Alexandria, Va.
Waynesburg & Washington Rd. 3 g. 28 m. 3 lo. 15 c.
C. E. Bower, *Supt.*.....Waynesburg, Pa.
A. M. Kline, *M. C. R.*.....Waynesburg, Pa.
Welland Ry. 4-8½ g. 25 m. 3 lo. 147 cars
William Pay, *Supt.*.....St. Catharines, Ont.
Jas. Taylor, *M. M.*.....St. Catharines, Ont
Wm. H. Pay, *M. C. R.*.....St. Catharines, Ont
West End Narrow Gauge Ry. 3 g. 16 m.
Rolla Wells, *Supt.*.....St. Louis, Mo.
M. M. Hodgman, *M. M.*.....Florissant, Mo.
West Feliciana R. R. 4-8½ g. 37 m. 2 lo. 22 cars
J. B. McGehee, *Pr. & Gen. Supt.*Bayou Sara, La.
J. A. Tilton, *M. M. & C. R.*.....Bayou Sara, La.
West Virginia, Central & Pittsb'g Ry. 13 m. 3 lo. 19 c.
W. E. Porter, *Gen. Supt.*.....Piedmont, W. Va.
W. T. Blackiston, *Fur. Agt.*.....Piedmont, W. Va.
F. W. Lippencott, *M. M. & M. C. R.*Piedmont.
Western R. R. (of Ala.) 5 g. 88 m. 15 lo. 270 cars.
Atlanta & W. Point Rd. 5 g. 87 m. 14 lo. 200 c.
Cecil Gabbett, *Gen. Man. & Supt.*..Mont., Ala.
.....Montgomery, Ala.
F. M. Wade, *M. C. R.*.....Montgomery, Ala.
Western Counties Ry. 4-8½ g. 67 m. 8 lo. 137 cars.
J. Brignell, *Supt.*.....Yarmouth, N. S.
Western Maryland R. R. 4-8½ g. 157 m. 16 lo. 394 c.
J. M. Hood, *Pr. & Gen. Man.*.....Baltimore, Md.
R. J. Adair, *Pur. Agt.*.....Baltimore, Md.
David Holtz, *Mast. of Mach.*.Union Bridge, Md.
J. H. Nusser, *M. M. & C. R.*.....Union Bridge, Md.
Western No. Carolina R. R. 5 g. 155 m. 6 lo. 36 c.
V. E. McBee, *Supt.*.....Salisbury, N. C.
Jos. P. Minetree, *Pur. Agt.*.....Richmond, Va.
J. W. Gates, *M. M.*.....Salisbury, N. C.
Western & Atlantic R. R. 5 g. 138 m. 48 lo. 952 c.
R. A. Anderson, *Gen. Supt.*.....Atlanta, Ga.
A. B. Bostwick, *Asst. Supt.*.....Atlanta, Ga.
W. R. Webster, *Pur. Agt.*.....Atlanta, Ga.
John H. Flynn, *M. M. & C. R.*.....Atlanta, Ga.
Wheeling & Lake Erie R. R. 168 miles.
C. R. Griggs, *Lessee & Manager*.....Toledo, O.
M. D. Woodford, *Gen. Supt.*.....Toledo, O.
L. James, *Gen. M. M.*.....Norwalk, O.
White Water R. R. (*See Ft. W., Cin. & Louis.*)
Wilmington & No'n R. R. 4-8½ g. 77 m. 13 lo. 148 c.
J. H. Thompson, *Supt. & P. A.*Coatesville, Pa.
George Rommel, *M. M.*.....Coatesville, Pa.
Alex. Maitland, *M. C. R.*.....Coatesville, Pa.
Wilmington & Weldon; Northeastern; S. C. Central; Cheraw & Darlington; Cheraw & Salisbury; and Wilmington, Columbia & Augusta R. Rs.
5 g. 599 miles 70 locomotives 1,120 cars.
R. R. Bridgers, *Gen. Man.*.....Wilmington, N. C.
J. F. Divine, *Gen. Supt.*.....Wilmington, N. C.
John Bisset, *M. M.*.....Wilmington, N. C.
W. H. Day, *M. C. R.*.....Florence, S. C.
J. E. Clowe, *M. C. R.* (W. & W.).Wilmington, N. C.
Windsor & Annapolis Ry. 4-8½ g. 130 m. 10 lo. 156 c.
P. Innes, *Gen. Man.*.....Kentville, N. S.
Wm. Yould, *M. M.*.....Kentville, N. S.
Wm. Grierson, *M. C. R.*.....Kentville, N. S.
Wisconsin Central R. R. 4-8½ g. 480 m. 49 lo. 1,608 c.
F. N. Finney, *Gen. Man.*.....Milwaukee, Wis.
F. A. Merrill, *Pur. Agt.*.....Milwaukee, Wis.
J. B. Henney, *Supt. M. P. & M.*.Stevens Pt. Wis.
Mil. & En Divs.: A. A. Allen, *S.*.Milwaukee, Wis.
W. & No. Div.: G. Campbell, *S.*.Stevens Point, Wis
Worcester & Nashua; and Nashua & Rochester R. Rs.
4-8½ g. 90 m. 20 lo. 505 cars.
C. S. Turner, *Pres. & G. Man.*.Worcester, Mass.
G. W. Hurlburt, *Supt.*.....Worcester, Mass.
John G. Brady, *M. M. & C. R.*.Worcester, Mass.
Worcester & Shrewsbury R. R. 3 g. 3 miles.
Worcester & Somerset R. R. 4-8½ g. 10 m. 1 lo. 4 c.
J. J. Colburn, *Supt.*.....Worcester, Mass.
G. E. Hapgood, *Pur. Agt.*.....Worcester, Mass.
Chas. Cleveland, *M. M.*.....Worcester, Mass.

Y

Youghiogheny R. R. 4-9 gauge.
Wm. Wilson, *Supt.*.....Irwin's, Pa

JAMES T. ALLEN,

233 & 235 Canal St., New York.

Dealer in all kinds of FOREIGN AND DOMESTIC VENEERS, adapted to Car and Cabinet Work. PANELS for car Work, got out to sizes, furnished in any kind of woods.

A GREAT IMPROVEMENT.

Ketcham's Positive Ferro-Prussiate, or

REVERSED BLUE PROCESS

paper gives dark blue lines on a white background on first impression, instead of white lines on blue background, as in the ordinary blue process paper, thus making the *altering* of lines or the *coloring* of any part of the drawing perfectly simple and easy.

Prices: in rolls of 11 yards in length by 30 in. wide, $4; 36 in., $5; 43 in., $6 per roll.

DRAUGHTSMEN'S MATERIALS.

Solar Printing and Blue Process Paper.

White and Manilla Drawing Paper in Sheets, Rolls or Mounted.

Tracing Cloth, India Ink, Pencils, Colors, Tacks, Instruments, &c., &c.

CHAS. F. KETCHAM & CO.,

Railroad Printers and Stationers,

27 AND 29 NASSAU STREET, NEW YORK.

SIMPLE, DURABLE AND CHEAP.

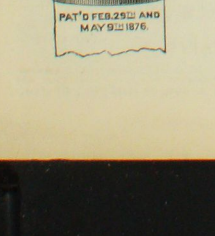
GLOBE

VENTILATORS,

For Ventilation of

Cars, Depots, Round-Houses AND WATER CLOSETS.

Twenty-five Sizes, from 2 in. to 48 in. inclusive.



MANUFACTURED BY THE

GLOBE VENTILATOR COMP'Y.

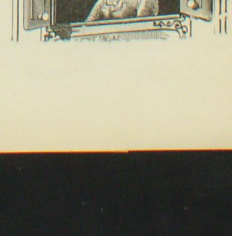
203 River Street, - - - - TROY, N.Y.

Catalogue and Price-List Furnished on Application.

GLOBE DEFLECTORS,

FOR

PREVENTING DUST OR CINDERS FROM ENTERING CARS.



ESTABLISHED 1852.

LAKE ERIE IRON CO.,

MANUFACTURERS OF

MERCHANT AND CAR IRON,

STEEL AND IRON FORGINGS OF EVERY DESCRIPTION.

STANDARD CAR AXLES

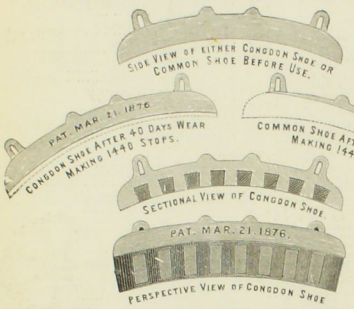
Steel Axle and Forgings a Specialty.

LOCOMOTIVE AXLES

Locomotive Frames, Piston Rods, Engine and Mill Shafting, Bolts, Nuts and Washers.

TRACK BOLTS, with Square or Hexagon Nuts. CLEVELAND, OHIO. BRIDGE BOLTS Plain or Upset Ends.

CONGDON'S IMPROVED CAR BRAKE SHOE.



This shoe, while being more effective, in that greater uniformity of friction can be obtained when applied to the wheels of a train in motion without stopping the revolution of any till the train is at rest, exceeds in life, or the durability of the Shoe itself, that of the cast iron shoe by over seventy-five per cent.

Its durability, together with cheapness and simplicity of construction, recommend it in preference to any other in use

All communications should be addressed to

THE CONGDON BRAKE SHOE CO.,

142 DEARBORN ST.,

Chicago,

Or Ramapo Wheel & Foundry Co. Ramapo, N. Y.

STEWART & LAWSON,

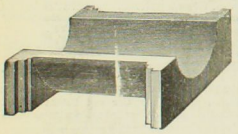
186 West Second Street, Cincinnati, O.

RAILROAD SUPPLIES, CONTRACTORS' SUPPLIES, MACHINISTS' SUPPLIES, AND STEEL.

Polished Compressed Steel Shafting and Piston Rods.

WM. S. BOSTWICK. W. W. YOUNG.

WM. S. BOSTWICK & CO.



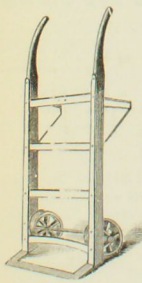
Bronze & Brass Foundry.

Engine, Locomotive, Car & Rolling Mill Brasses.

Correspondence solicited from Car-Builders.

Thirty-Third St. & A. V. R. R. - PITTSBURGH, PA.

PENFIELD BLOCK COMPANY,



LOCKPORT, N. Y.

FULL LINE

WOOD AND WROUGHT IRON

PULLEY BLOCKS

"ANCHOR BRAND."

WAREHOUSE TRUCKS,

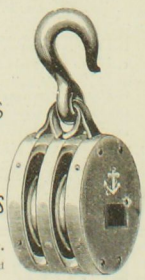
BAGGAGE BARROWS,

AND FOUR-WHEEL WAGONS

OF EVERY DESCRIPTION.

Wrought Iron Blocks a Specialty.

Send for Illustrated Catalogue and Price List, and mention this paper.



Reduced from $1.50 to $1.00 Per Year.

THE BUILDER & WOOD WORKER

Published the First of Every Month.

EVERYBODY WANTS IT

Who are interested in Building, Cabinet Making, House Decoration or Amateur Wood-work. Full of Designs for Houses, Cabinet and Amateur Work. Each number contains eight full sized pages of working Drawings. Sent to any address one year for $1.00; six months for 50 cents; three months for 25 cents. Send 3-cent stamp for sample copy. Address

FRED. A. HODGSON, Manager,

176 Broadway, New York, N. Y.

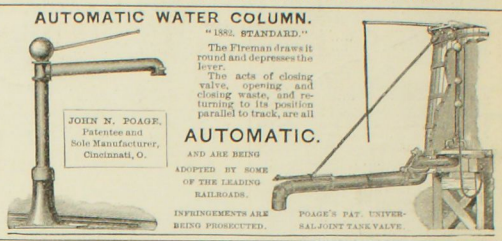
WM. E. UPTEGROVE & BRO.,

Mahogany & Veneer Saw Mills.

THE LARGEST WORKS of the KIND in the UNITED STATES

FOOT OF TENTH AND ELEVENTH STS., EAST RIVER, NEW YORK.

AUTOMATIC WATER COLUMN.



"1882. STANDARD."

The Fireman draws it round and depresses the lever.

The acts of closing valve, opening and closing waste, and returning to its position parallel to track, are all

AUTOMATIC.

AND ARE BEING ADOPTED BY SOME OF THE LEADING RAILROADS.

INFRINGEMENTS ARE BEING PROSECUTED.

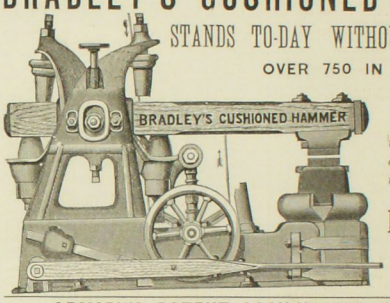
JOHN N. POAGE, Patentee and Sole Manufacturer, Cincinnati, O.

POAGE'S PAT. UNIVERSAL JOINT TANK VALVE.

BRADLEY'S CUSHIONED HAMMER

STANDS TO-DAY WITHOUT AN EQUAL.

OVER 750 IN USE.



It approaches nearer the action of the Smith's arm than any hammer in the world.

BRADLEY & CO.,

Syracuse, N. Y.

(Established 1832.)

ORMSBY'S PATENT SASH-HOLDER AND LOCK.

This invention is designed for railroad car windows, and consists of a concealed bolt in the right-hand lower edge of the sash, intersecting with a ratchet in the window-frame. The left-hand edge of the sash has a flat brass spring with a friction roller, which throws the sash to the opposite side and holds it tight. By pressing the thumb-piece hard to the left, the *bottom of the* sash will move in the same direction, and the window can thus be raised or lowered at will to any desired height.

This invention has been applied to cars on the following railroads:

Boston and Albany, Old Colony, N. Y. Manhattan Elevated, Baltimore & Ohio, New London Northern, Hudson River Day Line and many others.

Boston & Providence, Eastern, Michigan Central, Intercolonial & N. Scotia, Pullman Pal. Car Co.,

Boston, Lowell & Concord, N. Y. Cen. & Hudson River, Chicago & Alton, Great Western, Detroit, Lansing & No.,

THE ADVANTAGES OF THIS FIXTURE ARE:

1st. The window can be easily operated with one hand.

2d. When open, it will remain where it is placed, without danger of falling, thus avoiding injury to fingers and arms.

3d. A large or small quantity of fresh air can be admitted at the will of the passenger.

4th. It prevents the window from rattling.

5th. The extra play of the sash in the frame affords ample opportunity for it to swell in damp weather, and still be easily raised.

6th. The handle is also a LOCK, which is self-locking whenever the window is closed, and is unlocked in the operation of opening the window.

7th. It will outwear any other fixture.

For further information, or fixtures, address

JOEL H. HILLS, General Agent,

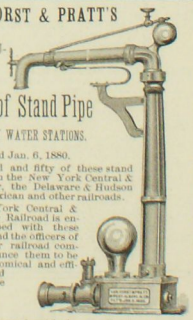
Ormsby Sash-Holder Company, Room D, Sears Building, Boston, Mass.

VAN VORST & PRATT'S

SINGLE AND DUPLEX

Frost Proof Stand Pipe

FOR RAILWAY WATER STATIONS.



Patented Jan. 6, 1880.

One hundred and fifty of these stand pipes in use on the New York Central & Hudson River, the Delaware & Hudson Canal, the Mexican and other railroads.

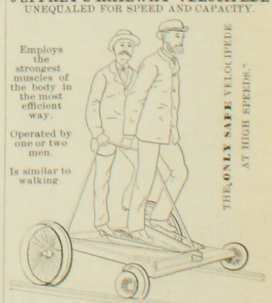
The New York Central & Hudson River Railroad is entirely equipped with these stand pipes, and the officers of this and other railroad companies pronounce them to be the most economical and efficient stand pipes in the market.

Full information furnished on application to

JAMES A. PRATT & CO., West Albany, N. Y.

JEFFREY'S RAILWAY VELOCIPEDE

UNEQUALED FOR SPEED AND CAPACITY.



Employs the strongest muscles of the body in the most efficient way.

Operated by one or two men.

Is similar to walking.

For particulars, address T. B. JEFFREY, 40 So. Canal St., Chicago, Ill.

IRON CITY SCRAP METAL CO.,

DEALERS IN

OLD RAILS, SCRAP IRON, STEEL, ETC.

229 SECOND AVENUE, PITTSBURGH, PA.

JAS. H. CLARK, President. E. M. GRANT, Manager, Secretary and Treasurer

THE CLEVELAND CRUCIBLE STEEL CO.,

MANUFACTURERS OF

TOOL AND MACHINERY STEEL

OF THE FINEST QUALITY.

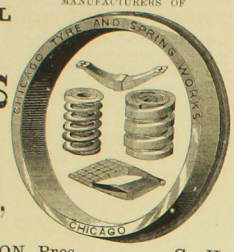
Western Agents: EWALD IRON CO., St. Louis, Mo.; CAMPBELL & LILL, Chicago, Ill.

Office and Works: Garden Street Crossing, C. & R. R. R., Cleveland, O.

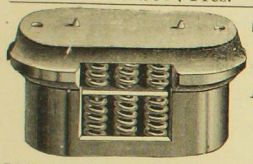
JAMES J. KELLY, New England Agent, 88 Kilby St., Boston.

JAMES JEFFRIES & SONS,
MANUFACTURERS OF
ELLIPTIC & HALF ELLIPTIC CAST-STEEL SPRINGS,
For Railroad Cars and Locomotives.
513 JAYNE STREET, PHILADELPHIA, PA.

CAST STEEL LOCOMOTIVE TYRES
Any specification
Works at MELROSE, ILL.
F. M. ATKINSON, Pres.

MANUFACTURERS OF


CAST STEEL CAR SPRINGS
of every description.
Office, 123 DEARBORN ST., CHICAGO, ILL.
C. H. FERRY, Treas

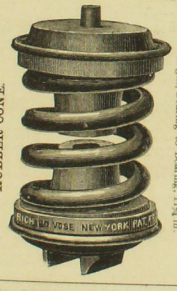


The Celebrated "Davis" Car Spring,
MANUFACTURED AND FOR SALE BY
A. B. DAVIS CAR SPRING CO.
(Limited),
S. W. Cor. 23d and Hamilton Sts.
PHILADELPHIA.

HEBBARD CAR SPRING CO.,
MANUFACTURERS OF
Steel Spiral Car Springs
OF EVERY DESCRIPTION,

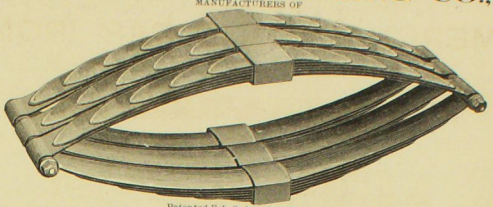
Knoxville, Tenn.

NATIONAL
Car Spring Company.
RICHARD VOSE, President.
NEW YORK: 13 Barclay St.
CHICAGO: 184 & 186 Washington St.
ST. LOUIS: 714 N. 2d St.
PHILADELPHIA: 208 Walnut St.



Adapted to a Car-Body Weighing 32,000 Lbs.
Diameter, outside Casting, 8 in.
Height, Bearing to Bearing, 11¼ in.

HON. W. T. MINOR, Pres. JOHN F. MOULTON, Vice-Pres. WILLIAM DAVISON, Sec'y. CHARLES W. MINOR Treas.
U. S. CONCAVE SPRING CO.,
MANUFACTURERS OF

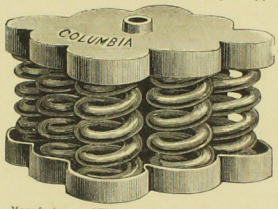


Patented Feb. 8, Aug. 2, 1881.
Crucible Cast Steel Concave Elliptic Springs, for Railroad Cars and Locomotives.
CURRAN DINSMORE, Gen. Man., Coal & Iron Exchange, 21 Cortlandt St., New York.

DIAMOND STATE CAR SPRING WORKS.
Manufacturers of
Elliptics, Locomotive and Improved Flat and Round Bar
NEST SPRINGS,
Of the Best Grade of Cast Spring Steel.
JAMES P. HAYES.

Jas. P. Hayes & Co.,
WILMINGTON, DEL.
SPIRAL SPRINGS
Of Every Description.
JAMES C. PICKELS.

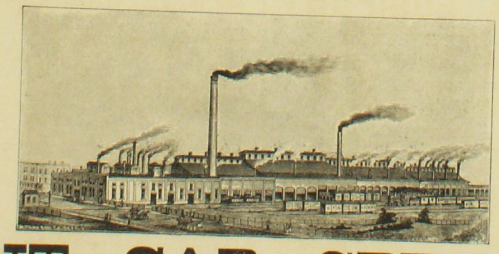
ANDREWS & CLOONEY,
GLOBE IRON & COLUMBIA
CAR SPRING WORKS.
Office, 545 West Thirty-third Street.
Works, 535 to 551 West Thirty-third St., and 538 to 552 West Thirty-fourth Street.
NEW YORK.



Manufacturers of Elliptic, Spiral, Volute Car and Engine Springs. Car Wheels, Axles, Pedestals, Brake Shoes, Boxes, Brass Bearings and Castings of all description where great strength is required. Also, Sweepers, Snow Plows, Turn-Tables, Automatic Switches, etc., for Street R. Rs.

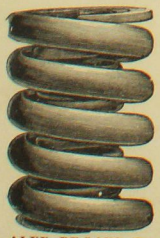
MANUFACTURERS OF
RAILWAY SPRINGS.
18th and Pennsylvania Ave.,
PHILADELPHIA, PA.
H. L. LEACH, Agt., 77 Water St., BOSTON, MASS.

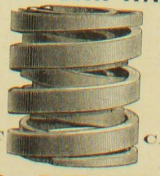
DETROIT STEEL WORKS,
MANUFACTURERS OF
STEEL.



SPRING STEEL
A SPECIALTY.

DETROIT CAR SPRING CO.,
MANUFACTURERS OF ALL DESCRIPTIONS OF
COIL AND ELLIPTIC RAILWAY CAR AND LOCOMOTIVE SPRINGS





FROM BEST CAST STEEL.
ALEX. DE LANO, President and Manager.
DETROIT, MICH.
H. R. NEWBERRY, Secretary.

PARROTT VARNISH COMPANY,

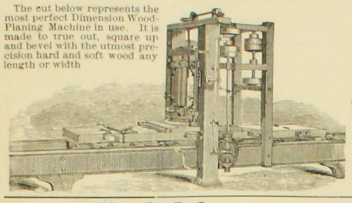
MANUFACTURERS OF FINE

RAILWAY VARNISHES,

BRIDGEPORT, CONN.

DANIELS PLANERS.

The cut below represents the most perfect Dimension Wood-Planing Machine in use. It is made to true out, square up and bevel with the utmost precision hard and soft wood any length or width



WOOD-WORKING MACHINERY,

MANUFACTURED BY

WITHERBY, RUGG & RICHARDSON, Worcester, Mass.,

26 SALISBURY STREET. (Shop formerly occupied by R. BALL & CO.

SPECIALTIES:

Woodworth Planing, Tonguing and Grooving Machines, Daniels Planers, Richardson's Patent Improved Tenon Machines, Mortising, Molding, Re-saw and Band Saw Machines, Picture Frame and Miter Cutting Machines, Box Machinery,

PATENT DOUBLE SAW BENCHES, SAW TABLES, &c.

IRON CASTINGS

FOR CARS, BRIDGES AND MACHINERY.

Superior LOCOMOTIVE Castings, Strong AND Easily Finished, A SPECIALTY

SPRINGFIELD FOUNDRY CO.,

101 Liberty Street,

SPRINGFIELD, - MASS.

EX INUTILI TRADE TANITE MARK UTILITAS

EMERY WHEELS AND GRINDING MACHINES,

THE TANITE CO.,

Stroudsburg, Monroe County, Pa.

Orders may be directed to us at any of the following addresses, at each of which we carry a stock

New York, 42 Dey St.
Boston, cor. High and Oliver Sts.
Philadelphia, 925 Market St.
Pittsburgh, 137 First Avenue.
Baltimore, 59 and 61 German St.
Indianapolis, 206 to 216 S. Illinois St.
Indianapolis, 184 and 186 E. Washington St
Cincinnati, cor. Pearl and Plum Sts.
Chicago, 152 and 154 Lake St.
" " 40 Franklin St.
Minneapolis, 254 Second Av., South
St. Paul, 316 and 318 Robert St.
St. Louis, 209 North Third Street.
" " 811 to 819 North Second St.
New Orleans, cor. Union & St. Charles Sts.
San Francisco, 2 and 4 California St.
Portland, Oregon, 43 Front St.
Sydney, N. S. W., 17 Pitt St.
Liverpool, Eng. 42, The Temple, Dale St.

Emery Rolls for Car Brass Grinding.
Special Wheels for Phosphor-Bronze Boxes.
Automatic Car Brass Grinder.
Locomotive Slide Bar Grinder.

* * * * * * * * * *

Important Specialty, Emery Wheels to grind Chilled Car Wheels. We sell to the actual user at unusually low prices. These wheels cannot be bought of any agent or dealer.

CURLED HAIR.
GLUE.
SAND PAPER.
EMERY CLOTH.

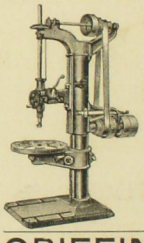
MANUFACTURED BY

BAEDER, ADAMSON & CO.

New York, 67 & 69 Beekman St.

PHILADELPHIA, 730 MARKET STREET.
BOSTON, 143 MILK STREET.
CHICAGO, 182 LAKE STREET.
CINCINNATI, 8 & 10 WEST PENN ST.

FELTING FOR REFRIGERATOR CARS AND BOILERS.



MACHINISTS' TOOLS.

UPRIGHT DRILLS,

Boring and Turning Mills,

A SPECIALTY.

H. BICKFORD,

CINCINNATI, O., - - - U. S. A.

Prices and Photographs on Application.

BOUND VOLUMES OF THE NATIONAL CAR-BUILDER

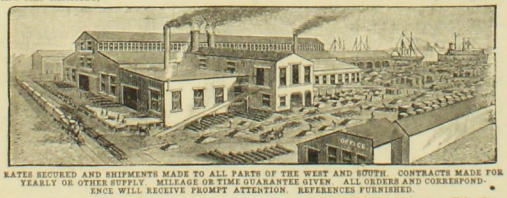
For 1880, 1891 and 1882.

Price, - - - $3.00 each.

Griffin & Wells Foundry Co.

Railroad Car, Engine and Street Car Wheels.

ANNUAL CAPACITY, 50,000 WHEELS.



RATES SECURED AND SHIPMENTS MADE TO ALL PARTS OF THE WEST AND SOUTH. CONTRACTS MADE FOR YEARLY OR OTHER SUPPLY. MILEAGE OR TIME GUARANTEE GIVEN. ALL ORDERS AND CORRESPONDENCE WILL RECEIVE PROMPT ATTENTION. REFERENCES FURNISHED.

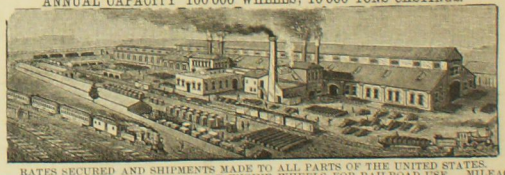
OFFICE & WORKS:
Paulina St., south of Blue Island Av.,

CHICAGO.

GRIFFIN CAR WHEEL CO.

RAILROAD CAR WHEELS AND CASTINGS.

ANNUAL CAPACITY 100 000 WHEELS; 10 000 TONS CASTINGS.



RATES SECURED AND SHIPMENTS MADE TO ALL PARTS OF THE UNITED STATES. SPECIAL ATTENTION GIVEN TO CAR AND ENGINE WHEELS FOR RAILROAD USE. MILEAGE GUARANTEED. CONTRACTS MADE FOR YEARLY OR OTHER SUPPLY. CORRESPONDENCE SOLICITED.

OFFICE AND WORKS:
Cor. Foundry St. and Michigan Central R. R.,

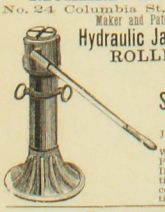
DETROIT, MICH

RICHARD DUDGEON,

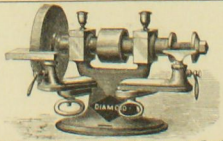
No. 24 Columbia St., New York,

Maker and Patentee of IMPROVED

Hydraulic Jacks, Punches ROLLER-TUBE EXPANDERS, AND DIRECT ACTING Steam Hammers.



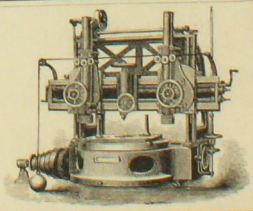
JACKS FOR PRESSING ON CAR-WHEELS OR CRANK PINS MADE TO ORDER. Communications by letter will receive prompt attention.



EMERY WHEEL MACHINERY from new and improved designs.

DIAMOND SOLID EMERY WHEEL. Hadley's Pat. Counter Shaft and Belt Shifter. Send for illustrated catalogue and prices.

Diamond Emery Wheel & Machine Co., Providence R. I. 275 So. Canal st., Chicago; 809 No. Second st., St Louis; 310 Robert st., St. Paul; 11 So. Water st., Cleveland.



NILES TOOL WORKS,

Hamilton, Ohio.

MACHINE TOOLS

FOR

Railroad, Locomotive and Car Shops.

ALL FROM NEW AND IMPROVED PATTERNS

PRICES AND PHOTOGRAPHS ON APPLICATION.

Eastern Office, 22 South Sixth St., Phila.

MANUFACTURERS OF BOLTS.

SEND FOR PRICE LIST.

PLUMB BURDICT & BARNARD BUFFALO N.Y.